

For Reference

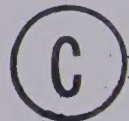
NOT TO BE TAKEN FROM THIS ROOM

Ex LIBRIS
UNIVERSITATIS
ALBERTAENSIS



THE UNIVERSITY OF ALBERTA
FACTORS DETERMINING SHIFTS IN DECISION MAKING
FOLLOWING GROUP DISCUSSION

by

 HUGH JOHN HALEY

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

EDMONTON, ALBERTA

FALL, 1970

Thesis
1970F
30D

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read,
and recommend to the Faculty of Graduate Studies for
acceptance, a thesis entitled "Factors Determining Shifts
in Decision Making Following Group Discussion" submitted
by Hugh John Haley in partial fulfilment of the require-
ments for the degree of Doctor of Philosophy.

ABSTRACT

Research has demonstrated that individuals shift their risk positions following group discussion. The purpose of this thesis was to assess the conjecture that the values of the stake and the prize affect both risk taking before group discussion and the shift in risk induced by group discussion. Specifically, it was expected that initial risk taking would be greater as the stake decreased and as the prize increased. Furthermore, group discussion was expected to increase the evaluation of the prize when the prize was higher than the stake and decrease the evaluation of the prize when the prize was lower than the stake. The changes in the evaluation of the prize were expected to affect risk taking during group discussion so that risk would increase on items with prizes higher than the stake and decrease on items with prizes lower than the stake.

A risk taking scale in which subjects indicated the lowest probability of winning that they would accept before gambling on betting scales with various stake-prize combinations was used. The predictions for initial risk taking were confirmed. Contrary to expectation, the stake rather than the prize determined a shift in risk taking on group consensus decisions. However, this effect was not sustained when the questionnaire was re-administered after group consensus. Furthermore, in the shift scores on this last administration of the questionnaire, the anticipated interaction between the stake-prize combination and group discussion was not found. However,

discussion did elicit an increase in risk that was not modified by the stake-prize combinations, and subjects in both discussion and non-discussion conditions increased in risk on items in which the prize was higher than the stake and decreased in risk on items in which the prize was lower than the stake.

Subjects evaluated the stake and prize following discussion. A significant discussion X stake interaction indicated that, as the stake increased, discussion enhanced the evaluation of the stake and prize. It was suggested that discussion enhanced the evaluation of the stake by emphasizing the monetary loss that might be incurred. In the absence of a significant discussion X prize interaction, it was suggested that discussion enhanced the evaluation of winning by emphasizing the reward connected with possible success in a gambling situation, rather than the monetary gain involved.

ACKNOWLEDGMENT

When I have reached for something there have always been many willing helpers. I wish to thank all who have supported me in my efforts. In particular, I should like to thank Dr. Brendan Rule who, with her patience and perseverance, has been a constant advisor and supporter. In a more indirect way, but in no less a capacity, the other members of my committee have always been ready to give assistance. Special thanks also go to my mother and Janet Macdonald without whose help this thesis would not have become a reality. Mrs. Joan Theander, who did the final typing on the thesis, will always be remembered with affection.

My grandfather has had more influence on my life than any other single person. To him I dedicate this thesis.

TO JAMES A. GAMBLE

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
DESCRIPTION AND GENERALITY OF THE RISKY SHIFT PHENOMENON	1
EXPLANATIONS OF THE RISKY SHIFT PHENOMENON	7
Risk Takers as Group Leaders	9
Diffusion of Responsibility	13
Information about Others' Views	17
Enhancement of Widely Held Values	20
Risky Shift and Betting Tasks	23
PROBLEM	27
METHOD	31
Subjects	31
Design	31
Materials	32
Procedure	33
RESULTS	39
DISCUSSION	70
REFERENCES	77
APPENDICES	82

LIST OF TABLES

TABLE		PAGE
1.	Values of the Prizes	32
2.	Analysis of Variance of Initial Risk Scores	40
3.	Mean Initial Risk Scores	41
4.	Analysis of Variance of Consensus Shift Scores	44
5.	Analysis of Variance of Post-discussion Shift Scores	46
6.	Analysis of Variance of Evaluations of the Prize	48
7.	Mean Evaluations of the Prize	50
8.	Analysis of Variance of Evaluations of the Stake	54
9.	Mean Evaluations of the Stake	56
10.	Analysis of Variance of Probability of Winning	59
11.	Evaluations of Chance of Winning	61
12.	Analysis of Variance of Evaluations of Probability of Losing	63
13.	Mean Evaluations of Chance of Losing	64
14.	Mean Confidence Ratings	66

LIST OF FIGURES

FIGURE		PAGE
1.	Mean initial risk scores in questionnaire X prize interaction	42
2.	Mean evaluations of the prize in questionnaire X prize interaction	50
3.	Mean evaluations of the prize in questionnaire X prize X stake interaction	52
4.	Mean evaluations of the stake for discussion and no discussion conditions	55
5.	Mean evaluations of the stake in questionnaire X prize interaction	57
6.	Mean evaluations of chance of winning in questionnaire X prize interaction	61
7.	Mean evaluations of chance of losing in questionnaire X prize interaction	65

LIST OF APPENDICES

APPENDIX	PAGE
A PROBABILITY ACCEPTANCE SCALES	83
B RATING SCALE FOR EVALUATIONS OF PRIZE, STAKE, PROBABILITY OF WINNING, PROBABILITY OF LOSING . . .	100
C FILLER TASK	102
D ANALYSES OF CONFIDENCE SCORES	108

INTRODUCTION

In the last decade a considerable amount of research has demonstrated that individuals are willing to take more risk after group discussion than they had been willing to take formerly when deciding alone. Since Stoner (1961) first demonstrated the risky shift phenomenon, there has been much research to assess both the generality of the phenomenon and various explanations for its occurrence. A review of the research to 1967 was published by Kogan and Wallach (1967d). This thesis will review the literature up to 1970, and present a study designed to clarify the factors producing the risky shift.

DESCRIPTION AND GENERALITY OF THE RISKY SHIFT PHENOMENON

The basic research paradigm requires that subjects respond to a probability acceptance or choice scale and then discuss, in groups of 3-8, their respective positions on the scale. Instructions usually require that the discussion lead to a group consensus. Following the discussion, the subjects are asked to respond to the scale again to assess the individual positions after discussion. Two types of measures are used in this research, both of which indicate that a shift in risk taking occurs. The first measure compares the individual's first position with the group consensus position. The second measure compares the first position with the position the individual holds when he fills out the scale following group consensus.

The most common instrument used in this research is Wallach and Kogan's Choice Dilemmas Questionnaire (Wallach & Kogan, 1959). This questionnaire consists of twelve items, each of which describes a real

life issue in which the person involved has to make a choice between two courses of action. One choice involves little or no risk but the potential reward is of low value. The other choice involves a certain degree of risk but the potential payoff is of considerable value. The subject is asked to indicate the lowest probability of success for the risky alternative that he would accept before advising the central person to take the riskier course of action. The Choice Dilemmas Scale allows the subject to choose a probability of 1/10 to 9/10, in intervals of 2/10, with a final choice of being not willing to accept the risky course of action, no matter what the probabilities are. Each interval is given a score equal to the numerator of the probability indicated in that interval, with the choice of not being willing to take the risky alternative under any conditions scored as either 10 or 11. The Choice Dilemmas Scale served as a model for other scales that were developed, using the same basic design (Nordhøy, 1962; Rabow, Fowler, Bradford, Hofeller, & Shibuya, 1966; Siegal & Zajonc, 1967; Stoner, 1968).

The risky shift phenomenon was demonstrated in various populations. It has occurred in both sexes (Wallach & Kogan, 1965; Wallach, Kogan, & Bem, 1962), various occupational groups (Marquis, 1962; Rim, 1963; Wallach *et al.*, 1962), and within United States (Wallach *et al.*, 1962), British (Bateson, 1966), Canadian (Haley, 1968), and Israeli (Rim, 1963) national groups. The risky shift also has been demonstrated when subjects were risking the possibility of having to experience unpleasant situations (Bem, Wallach, & Kogan, 1965); when subjects were gambling on the possibility of being able to correctly answer questions

from the College Board Examinations which have been answered correctly by stated percentages of the population (Wallach, Kogan, & Bem, 1964); when mental health teams discussed clinical issues (Siegal & Zajonc, 1967); and when the issues involved unethical situations (Rettig, 1966a, 1966b; Rettig & Turoff, 1967). The phenomenon also occurred when subjects were asked to gamble for points (Blank, 1968) or on money items when the choices were either between variance preferences or probability preferences (Coombs & Pruitt, 1960; Pruitt & Teger, 1969). However, other research has found that the risky shift occurred when using money items only if there was uncertainty as to either the actual value of the money or the probability of the outcomes. (Hinds, 1962; Hubbard, 1963; Marquis & Reitz, 1969).

Some research has indicated that a shift in risk taking following group discussion does not always occur in the risky direction. Some items on the Choice Dilemmas Scale and some newly developed items have induced shifts in the conservative direction (Nordhøy, 1962; Rabow et al., 1966; Stoner, 1968). However, the conservative shift has been more difficult to replicate than the risky shift. Kogan and Wallach (1967d) have disputed the validity of the conservative shift on the grounds that the less certain alternatives in Rabow et al.'s items were not of higher desirability than the pursuit of the certain choice. If this argument is correct, the uncertain alternative was not worthwhile or desirable and risk taking can not be considered rational behaviour. Stoner (1968) had subjects rate what he described as the alternative outcomes which were implicit in 12 life situation items. He found that for conservative

shift items, the safer alternative was more highly valued than the riskier alternative. However, there are many contingencies involved in the life situation items, the most prominent of which appear to be: (1) what has to be sacrificed in order to take the risky alternative, (2) the consequences if success does not occur when taking the risky alternative, (3) the consequences if success does occur when taking the risky alternative, and (4) the factor of regret that might later occur if the risky alternative is not taken while it is available. The values of the first two contingencies would motivate the subjects to take a cautious position, while the values of the second two contingencies would motivate the subjects to take a risky position. Stoner's rating instrument consisted of short phrases describing the alternative outcomes, and it is quite clear that all the contingencies involved were not represented. Furthermore, a reading of Stoner's and Nordhøy's items does not convince one that the more uncertain alternative is of less value than the certain one. It is inadvisable to make such descriptions of the items on a post-hoc basis, and it has been very difficult to develop items for which a conservative shift can be confidently predicted. More research is needed to establish what determines a conservative shift on some items and a risky shift on others. It is also unclear whether the same process is operating in both the conservative shift and risky shift items.

Clark and Willems (1969) demonstrated that a change in the instructions on the Choice Dilemmas Questionnaire eliminated the risky shift phenomenon. They suggested that the original questionnaire induces

an instructional set by asking the subjects to check the lowest probability that they would consider acceptable. These instructions presumably put pressure on subjects to accept positions at the high end of the risk scale and reject positions at the lower end. When Clark and Willems removed the "lowest acceptable" instructional phrase the risky shift did not occur. However, Clark and Willems' explanation does not explain the conservative shifts which have been demonstrated (Hinds, 1962; Stoner, 1968), or the greater risk taking which has occurred when this "lowest acceptable" instructional phrase was not used (Bem et al., 1965; Hubbard, 1963; Marquis & Reitz, 1969; Pruitt & Teger, 1969; Rettig, 1966a, 1966b; Rettig & Turoff, 1967; Wallach et al., 1964). Furthermore, the Clark and Willems new instructions might have appeared ambiguous to the subjects, leading to a compromise position in the group discussion (Wallach & Mabli, 1970).

Little empirical attention has been given to the group members' initial positions on the risk scale. It is possible that the risky shift phenomenon is influenced by a particular distribution of risk positions within the group. Burns (1967) explained the risky shift by postulating an interaction between variability within the group and an extremity bias. He postulated that individuals at either extreme of the risk taking scale are more confident in their opinion, while those at the middle of the scale are uncertain and easily moved in either direction. If there is variability in the opinions of the group an exchange of opinion is necessary in order to reach group consensus. This exchange of opinion reveals the positions of the extreme subjects, which supports

a shift toward the extreme bias represented within the group. Such a shift will not occur unless both of the postulated components are present. Burns (1967) only reported correlational support for his notion.

There is some evidence that variability within the group is necessary for the risky shift to occur. Hoyt and Stoner (1968) composed groups of individuals who all held the same position on the total score of the Choice Dilemmas Scale. They found that the risky shift still occurred, but at the same time noted that even after manipulation of the group composition there was considerable variability in the positions on the individual items of the scale. This latter problem invalidated their test of the hypothesis. A more adequate procedure was used by Ellis, Spencer and Oldfield-Box (1969) who held variability constant on individual items of the Choice Dilemmas Scale and found no significant shifts following group discussion. It thus appears that variability in initial opinions of the group members is necessary for the risky shift to occur.

The fact that variability is necessary for the shift to occur does not indicate that the presentation of an extreme position contributes to a shift. Haley (1968) brought together groups which were composed of either a high or low risk taker and three moderate risk takers. Dispersion among the risk positions of the moderate subjects was manipulated. Contrary to Burns' notions, group discussion led to a risky shift in all conditions, with the amount of the risky shift being greater when there was less variability among the moderate subjects' positions than when there was more. Wallach and Mabli (1970) and Vidmar (1970) also varied

the initial positions of group members, composing groups of combinations of high, low, and moderate risk takers. They demonstrated that risk increased in all conditions. It appears that conformity to either an extreme position or to a majority position is not an adequate explanation of the shift phenomenon. Ellis et al. (1969) and Haley (1968) suggested that variability is an important factor in determining the risky shift, but Haley (1968) and Wallach and Mabli (1970) suggested that the direction of the shift is not determined by the direction of a bias in the original group composition.

Vinokur (1969) measured skewness as the difference between the median and the mean of initial risk positions within the groups and studied its effects by bringing together groups of various skewness levels. Vinokur also reanalysed some earlier data reported in the literature (Wallach & Kogan, 1965; Wallach et al., 1962; Wallach, Kogan, & Burt, 1965). He found little evidence that skewness determined the risky shift. However, there are some items within the Choice Dilemmas Scale which do not contribute to the shift in risk taking. For these items skewness did influence the amount and direction of a shift.

The foregoing review indicates that the risky shift is easily replicated and is a general phenomenon across subject populations and various scales. Why the shift occurs remains to be explained. The following section reviews the literature which has attempted to find an explanation of the phenomenon.

EXPLANATIONS OF THE RISKY SHIFT PHENOMENON

Kogan and Wallach (1967d) have discussed several explanations of

the risky shift phenomenon. The theories discussed explain the risky shifts by: (1) Risk taking exists as a socially desirable orientation, (2) Sympathy is provided by others present, (3) Information is provided about the task, (4) Risk takers are group leaders, (5) Diffusion of responsibility occurs, or (6) A comparison of one's own position with other group members' positions is made. Another explanation has been that discussion enhances widely held values (Nordhøy, 1962). The first three of these explanations have been rejected on the basis of research findings, but the other explanations are still debated extensively in the literature. In the subsequent review, the reasons for rejecting the first three notions are briefly discussed. Then, currently held explanations are considered in detail.

The notion that risk taking exists as a socially desirable orientation suggests that the risky shift occurs because subjects are attempting to have others perceive them as high risk takers. This suggestion leads to the expectation that anticipated disclosure of a subject's position leads him to take greater risks. Bem et al. (1965) rejected this notion because they found no risky shift when subjects were told that their positions would be made public, or when they were told that they would discuss their positions to reach consensus with others in a group. The second explanation suggests that the risky shift is caused by the expectation that others will be present to sympathize with the subject if the risky decision eventuates in an undesirable state of affairs. The knowledge that others will be present when the consequences occur presumably causes the risky shift. However, Bem et al. (1965)

found no shift when subjects were told that others would be present when the consequences occur. No other evidence has supported either of the above notions, so that both of these are inadequate explanations for the risky shift.

The conjecture that group discussion discloses information which clarifies the contingencies involved in the items was also rejected by Kogan and Wallach (1967d). They found that the risky shift occurred in experiments in which each of the choices had equal expected value (Wallach et al., 1964) or negative expected values (Bem et al., 1965). A rationality hypothesis predicts no shift under the former conditions and a conservative shift under the latter conditions. However, the rejection of the notion that discussion leads to a clarification of the items might have been premature because in both of the above experiments the subjective expected values and the objective expected values appear to have deviated considerably from one another. This latter point is reconsidered later in this section when experiments with betting tasks are discussed.

Risk Takers as Group Leaders

Clausen (1965) suggested that the high risk taker is more influential in group discussion because he is more confident in his position than is the low risk taker. She used the task formerly used by Wallach et al. (1964), where subjects gambled on the possibility of being able to correctly answer questions from the College Board Examinations which had been answered correctly by stated percentages of the

population. She found that high risk takers were not necessarily more confident on all types of items, but in discussion groups high risk subjects who were confident in their opinions were rated as more influential. She also found that the subjects who were both highly confident and high risk takers elicited a greater shift in their direction than subjects who were also at the high end of the risk scale, but low in confidence. Further research is needed to demonstrate the generality of this effect to tasks other than antonym performance, and to groups in which moderate subjects are represented.

Other research has demonstrated that high risk takers are rated as more influential following group discussion than are low risk takers in risky shift items (Wallach et al., 1962; Wallach et al., 1965), and low risk takers are rated as more influential in conservative shift items (Nordhøy, 1962). However, this effect might occur because the subjects perceive a shift in either of the two directions and then allocate responsibility for this shift to those members of the group who hold positions in that extreme direction. This interpretation is supported by evidence that subjects actually do recognize that the groups shift in the risky direction (Wallach et al., 1965). Furthermore, it has been demonstrated that when some personality characteristics are varied systematically, the risky shift does occur in the absence of a correlation between initial risk and perceived influence (Kogan & Wallach, 1967b; Wallach, Kogan, & Burt, 1967).

Wallach, Kogan, and Burt (1968) reasoned that if high risk takers are more influential, this risk would be demonstrated on risk irrelevant

material. To examine this notion, high and low risk takers discussed positions on non risk materials with moderate risk takers. There was little evidence that the high risk takers were more influential. However, this does not mean that the high risk takers do not exert disproportionate influence on items of risk and no influence on items of no risk. High risk takers may be influential on risky decision issues for reasons such as their having more information about the risk items, more confidence in dealing with risk items, or a different evaluation of the utilities involved.

Other research has demonstrated that high risk takers did not shift away from their extreme positions as readily as did the low risk takers (Haley, 1968; Vidmar, 1970; Wallach & Mabli, 1970). This research suggested that high risk takers are not as susceptible to influence as are low risk takers. However, the reason for this might be simply that since they are at the extreme end of the scale towards which the rest of the group is moving, they do not have to move as great a distance as does the rest of the group.

The studies by Hoyt and Stoner (1968) and Vidmar (1970) in which they held the position on the total risk scale constant within the groups, and still found a risky shift, might on first hand, suggest that a high or low risk taker is not necessary for the shift to occur. However, there was still a great deal of variability on individual items so that different subjects might be high risk takers on certain items but not on others. This criticism can also be raised against the Wallach et al. study (1968). Ellis et al. (1969), who controlled the variability in the risk taking positions of their groups on individual items, found that an increase in risk

taking did not occur. However, the question still remains of whether it is the degree of dispersion alone, or a dispersed distribution anchored by an extremely high risk position which accounts for the risky shift. Haley (1968), who composed his groups of either a high or low risk taker, and three moderate risk takers, found that the groups shifted in the direction of high risk in all cases. Vidmar (1970) also found that the risky shift occurred when his groups were composed entirely of low risk takers. It appears that although risk takers might be more influential, their influence does not entirely account for the increase in risk.

If high risk takers are more influential it might be expected that they would dominate the conversation more than low risk takers. Stoner (1961) found no correlation between a subject's risk position and the amount of time he talked in the group discussion. Haley (1968) found little evidence that high risk takers initiate conversation more often than other individuals in the group discussion, or that the amount of times they initiate the conversation is correlated with the group's increase in risk. Haley did find a correlation between the number of times the individuals in the total group initiated conversation and the degree of shift in the high risk direction. A possible explanation of the results of Haley (1968) and Ellis et al. (1969) is that variability induces more discussion and it is discussion of the different positions on the scale which leads to an increase in risk.

Rim (1963, 1964a, 1964b, 1966) reported several studies in which he attempted to investigate the relationship between initial risk taking, amount of shift following group discussion, influence in the group dis-

cussion, and personality characteristics of the subjects. The research suggested that certain personality characteristics are related to risk taking on the Choice Dilemmas Scale (i.e. need for achievement, extraversion, machavellianism, tough-mindedness, and radicalism-conservatism). However, other relationships reported by Rim are difficult to interpret because his conclusions are based on differences between subjects within groups for which no attempt is made to manipulate the composition in regard to either personality or initial risk taking. It is difficult to interpret the cause and effect relationships that are involved in his studies. Rim's research does not demonstrate anything beyond that which has been demonstrated by other research related to the leadership hypothesis.

Diffusion of Responsibility

Wallach et al. (1964) suggested that following discussion there is a lessening of the feelings of responsibility for the possible outcomes in a risk taking situation. For this reason, individuals within the group are willing to take more risk. This explanation is closely related to Le Bon's (1895) analysis of crowd behaviour and to Allport's (1924) notion of "an impression of universality", whereby a member within a crowd perceives that an action undertaken by the crowd receives the approval of everyone. Wallach et al. (1964) argued that their study supports the diffusion of responsibility notion. Their study demonstrated that when the group came to a consensus regarding an acceptable difficulty level (group decision) an increase in risk occurred. An

increase in risk did not occur when a subject chose individually the level at which he would answer for the group, but did occur when the subjects as a group chose the level at which one of them individually would answer for the group. The authors suggested that the group decision caused the risky shift because of the operation of diffusion of responsibility. The basis for this conclusion is weak, in that another common factor in the risky shift groups was group discussion and the notions of information exchange or enhancement of widely held values could be used to explain the results.

Rettig (1966b) pointed out that if diffusion of responsibility is influential, group decision, rather than group discussion, would be the critical factor, while Wallach and Kogan (1965) found the opposite to this. Opposing Rettig's criticisms, Kogan and Wallach (1967d) pointed out that affective bonds which develop during discussion facilitate the risky shift. Kogan and Wallach are supported by Bovard's (1953, 1956) research which found that group members who participate in verbal interaction increase in affection for each other. However, the development of affective bonds would not be expected if the subjects do not interact face-to-face with one another. Contrary to this notion, research has demonstrated that physical separation of group members does not influence the shift in the risky direction (Kogan & Wallach, 1967a) and that the shift occurs when the subjects are merely observers of the group discussion (Kogan & Wallach, 1967c; Lamm, 1967). Pruitt and Teger (1969) also found that with money items, groups who developed affective bonds while discussing one set of items and then individually

answered a second set did not show a risky shift on the second set of items.

In support of the diffusion of responsibility notion, Kogan and Wallach (1967d) discussed research in which personality variables were systematically varied. When test anxiety and defensiveness were varied (Kogan & Wallach, 1967b) risky shifts were obtained for all groups, but the magnitude of shift was greatest for anxious subjects and least for defensive subjects. Because defensiveness might imply an unwillingness to engage in the level of affective interchange necessary for diffusion of responsibility to occur, the authors suggested that the results supported the responsibility diffusion explanation. However, it was also found that the more anxious subjects were initially more conservative, and other research has indicated that the more conservative subjects shift most following group discussion (Haley, 1968; Vidmar, 1970; Wallach & Mabli, 1970). There is no direct evidence that the intervening variable between a conservative position and increase in risk following group discussion is diffusion of responsibility.

When field-dependent and field-independent groups were separately studied, it was found that both groups exhibited the same amount of risky shift, but field-independents took longer to reach their consensus decisions than field-dependents (Wallach et al., 1967). This was expected since field-independents have greater tendencies toward cognitive analysis while field-dependents have tendencies toward intuition and empathy (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962). It was further found that the risky shift was smaller, when the field-

independents spent more time discussing the issues, but the risky shift was greater when the field-dependents spent more time in discussion. Since the field-dependents are more inclined toward affective relationships, it was assumed that diffusion of responsibility was operating within these groups, so that more conversation elicited more shift in the risky direction.

In arguing against the diffusion of responsibility explanation, Bateson (1966) pointed out that a risky shift which lasted for a period of time would suggest an actual cognitive change. Since the diffusion of responsibility notion does not entail cognitive change, Wallach and Kogan's explanation seems to be refuted by their own research which found that the effect lasted for several weeks (Wallach et al., 1962).

Marquis (1962) presented the most damaging evidence against the diffusion of responsibility explanation. Marquis had two discussion groups, one in which the group was required to reach a consensus decision, and another in which the experimenter designated a group leader who, after hearing each problem discussed by the group, was required to make a personal decision on behalf of the group. Diffusion of responsibility predicts that the group decision condition would yield a risky shift, but the group leader condition would not. Both conditions showed an equally large risky shift.

The diffusion of responsibility theory has not explained conservative shifts that have occurred on certain items (Stoner, 1968) and can not integrate the results from other studies in the area. Furthermore, the way in which diffusion of responsibility operates is vague so that,

even while there may be some evidence for it, it does little to explain how the risky shift occurs. At best it serves as a partial explanation of the risky shift phenomenon, and at worst it offers nothing to clarify the process by which the risky shift occurs.

Information about Others' Views

Brown (1965) suggested that on risky shift items moderately high risk taking is a social norm and on conservative shift items, moderate conservatism is a social norm. Discussion presumably allows for a comparison of the individual's position on the scale with the positions of others, and since most people find that they are not as extreme as they had originally thought, they shift in the acceptable direction. This notion has received support from findings that subjects estimated that the general population would have an acceptance level lower than their own on risky shift items (Hinds, 1962; Levinger & Schneider, 1969; Stoner, 1968; Wallach & Wing, 1968) and higher than their own on conservative shift items (Stoner, 1968).

Wallach and Kogan (1965) first rejected this interpretation on the basis of research that found that knowledge of the amount of risk advocated by others in the group was unimportant, but Teger and Pruitt (1967) suggested that the experimental procedure which involved balloting until consensus was reached, forced the subjects toward an arithmetical compromise as a way out of an unpleasant situation. When Teger and Pruitt used three successive rounds of public balloting, without a consensus requirement, they found that there was a significant risky

shift. However, this was less than obtained in the conventional discussion condition. Kogan and Wallach (1967c) further tested Brown's notion by having subjects listen to taped discussions of the Choice Dilemma issues. The risky shift occurred in listening subjects, but not to the extent that is normally found. It is possible, however, that the smaller shift in certain conditions of these experiments is due to a decrease in either motivation or attention. Evidence for this interpretation was found by Lamm (1967) who demonstrated that subjects observing the discussion groups through a one-way mirror shifted to the same extent as the discussants, but when the discussion was transmitted into a separate room the listener-only subjects did not show as large a risky shift.

Madaras and Bem (1968) compared the ratings given to individuals who were described as taking the risky course of action on the Choice Dilemmas Questionnaire with the ratings given to individuals who were described as taking the conservative course of action. Individuals who had taken the risky course of action were rated more desirably than those who had taken the conservative course of action. Levinger and Schneider (1969) also demonstrated that the average subject most admired a choice more risky than his own. Subjects in Madaras and Bem's study rated conservatives more favourably than high risk takers on conservative shift items. Because the favourable ratings occurred on different combinations of items for the conservative shift and the risky shift scales, Madaras and Bem suggested that different processes underly responses to these two scales. However, the evidence for this is weak because the number of

subjects used for the ratings of the conservative items was very small, and it is unclear from the authors' report exactly which risk taking items were used.

Brown's notion suggests further that the important factor operating in the group discussion is a comparison of one's own position with the position of others on a risk taking scale. This notion suggests that if subjects were given some indication of other subjects' positions on certain items, they would shift in risk on both these items and similar items. Vidmar (1970) found that a greater increase in risk taking occurred in groups in which there was large variability than in those in which variability was less. He interpreted these data as support for Brown's notion because the subjects who had an initially low risk position would have to move a considerable distance to preserve their self-perception of being high risk takers. Madaras and Bem (1968) asked subjects to discuss one-half of the Choice Dilemmas Scale and following discussion to fill out the other half of the scale individually. Pruitt and Teger (1969) had subjects do the same thing on money items that formerly had shown the risky shift. Both experiments demonstrated the risky shift on items that were discussed, but this shift did not transfer to items that were not discussed. Results of both of these studies give strong indication that more is involved in the risky shift than a simple comparison of risk taking positions. It appears that individual items must be considered in discussion for the phenomenon to occur.

Enhancement of Widely Held Values

Another notion, closely related to Brown's, is that the saliency of social or cultural values is enhanced in group discussion. Nordhøy (1962) suggested that in a situation in which the social values support a risky position, group discussion enhances the importance of the high risk position and causes a shift in that direction. Furthermore, in situations in which social values support a cautious position, group discussion would lead to a shift in the cautious direction. Nordhøy (1962) devised items which induced a conservative shift, although his success was only partial, since on other items for which he predicted a conservative shift no such shift occurred. Stoner (1968) developed items on which he had subjects rank in importance the alternative outcomes of each of the items. On items for which he predicted a conservative shift, the cautious alternative was ranked as more important than the risky alternative, and on items for which he predicted a risky shift the risky alternative was ranked as more important than the conservative alternative. Also subjects had a higher mean initial risk score on risk orientated items than they had on cautious orientated items. When subjects were asked to compare their own risk taking scores with the scores of people similar to themselves, subjects considered themselves more risky on all risk orientated items, and more cautious on all but one of the cautious orientated items. After discussion of the items, subjects shifted in the high risk direction on all risk orientated items, but showed significant shifts in the conservative direction on only two of the cautious orientated items. A shift in the high risk direction

occurred on one of the other cautious orientated items and no shift occurred on three of them. Stoner (1968), in another study, replicated the conservative shifts found on his conservative orientated items, but in his first study was not able to replicate the conservative shifts found in Nordhøy's (1962) conservative shift items. These data indicate the difficulty in replicating conservative shifts, a difficulty which is not found in items which show the risky shift.

Bateson (1966) and Flanders and Thistlethwaite (1967) have supported the position that discussion enhances the saliency of widely held values. These authors found that after preparing detailed notes on the points favouring and opposing the choice of the risky alternative, the subjects showed significant shifts in the risky direction. The authors suggested that individuals are initially cautious in dealing with new material, and increased familiarity with the material leads to a decrease in this caution. An equally valid explanation, consistent with Stoner's (1968) and Nordhøy's (1962) explanation, is that increased familiarization leads to an increase in the salience of social norms. Marquis (1968) found that Bateson's research strategy produced a conservative shift on Nordhøy's items. This conservative shift is not consistent with Bateson's explanation, but is consistent with the social norm explanation. However, the importance of these data is diminished because of difficulty in replicating the results. Both Pruitt and Teger (1967) and Rule and Evans (1970) have failed to replicate Bateson's and Flanders and Thistlethwaite's results.

Teger and Pruitt (1967) and Stoner (1968), using the original

Wallach and Kogan Choice Dilemmas Scale found a positive correlation across items between initial risk positions and subsequent increase in risk. Since higher initial risk is expected on items for which it is more socially acceptable to take risk, these data again support Nordhøy's approach to the problem. Further support is found in research by Teger and Pruitt (1967) and by Haley (1968). Teger and Pruitt (1967) found that the larger the group, the greater was the increase in risk following group discussion. Haley (1968) found a positive correlation between the amount of times discussion was initiated and the amount of change in the risky direction. Both the size of the group and the length of group conversation might be positively related to the preciseness with which a group examines social values.

If social values were the important determinants of the amount and direction of shift in risk taking, a decrease in risk taking should occur in an unethical risk taking situation. Rettig (1966a, 1966b) and Rettig and Turoff (1967) found that individuals, following group discussion, were more inclined to take part in an unethical situation even if the chance of censure was very high. Furthermore, if the social component of values was important for the occurrence of the risky shift, as is suggested by Nordhøy (1962), betting situations should not produce the risky shift. Some research has demonstrated that on betting tasks the risky shift does occur (Hubbard, 1963; Marquis & Reitz, 1969; Pruitt & Teger, 1969), but other research has suggested that the shift does not occur (Atthowe, 1961; Hinds, 1962; Hunt & Rowe, 1960). The research using betting tasks is complicated, and for this reason it will be considered in a separate

section. However, the research demonstrating a risky shift in both unethical and betting situations suggests that social values may not be the important component. This does not suggest, however, that the saliency of values in general is not enhanced by group discussion. It is possible that the social or moral component of values need not be invoked to explain the risky shift phenomenon.

Risky Shift and Betting Tasks

A series of studies (Atthowe, 1961; Hinds, 1962; Hunt & Rowe, 1960; Lonergan & McClintock, 1961) has indicated that the risky shift phenomenon does not occur when the situation involves staking a sum of money in order to win extra money. Pruitt and Teger (1969) have noted questionable features of these studies and demonstrated a risky shift in an experiment in which these features were eliminated. Hunt and Rowe (1960) demonstrated a balancing effect among money items in which subjects took large risk on one item and then on the other items made cautious decisions with their remaining money. A similar balancing effect might have been operating in Hinds' study (1962). Pruitt and Teger (1969) eliminated the balancing effect by telling subjects that only one item would be played off and this item would be randomly chosen at the end of the experiment. Because Atthowe's (1961) instructions emphasized reasoning, his subjects may have perceived the task as one in which intellectual, rather than preferential, behaviour was appropriate. Lonergan and McClintock (1961) actually did find a nearly significant shift toward risk, but they had a small number of groups in the study.

Hubbard (1963) and Marquis and Reitz (1969) found that a risky shift occurred on Hind's items if either the stake, prize, or probability of winning was described as a range of possible values rather than one discrete value. Hubbard also found that subjects were initially more risky on items in which the values of the stake, prize, or probability of winning were exactly defined, rather than when the values were defined as a range, the extremes of which were computed by adding and subtracting a constant from the exact value. Hubbard's explanation of these results was that individuals are cautious when the values involved in a gambling situation are uncertain, and group discussion counteracts this cautiousness, thereby causing a risky shift. This notion alone cannot explain the cautious shifts that occur in some items. To overcome this difficulty, Marquis and Reitz (1969) postulated that the expected value of the situation also influences the direction of shift after group discussion. According to their notion, zero expected value does not influence the direction of the shift, but a positive expected value induces a shift in the high risk direction and a negative expected value induces a shift in the low risk direction. Marquis and Reitz (1969) reported data which demonstrated the influence of both the expected value and uncertainty. However, the negative expected value items had an expected value of -25% of the stake, while the positive expected value items had an expected value of +10% of the stake. When the expected value was -10% of the stake, no shift occurred. The evidence from these data on the influence of expected value is ambiguous. Furthermore, neither the influence of expected value or of uncertainty can explain the shift found by Pruitt

and Teger (1969). The experiments of Hinds (1962), Hubbard (1963), and Marquis and Reitz (1969) differ from the experiments of Pruitt and Teger (1969) in that only one item was played off in the Pruitt and Teger experiment while all items were played off in the Marquis and Reitz study, and none of the items were played off in the Hubbard experiment. Whether these differences in procedure are the reasons for the difference in the results cannot be decided without further research.

Hinds (1962), Hubbard (1963), Marquis and Reitz (1969), and Pruitt and Teger (1969) have all used a paradigm in which the stake is lost in all cases regardless of whether the subject wins or loses. A more common paradigm is one in which the stake is lost only if the subject does not win the prize. If we can assume in the Choice Dilemmas Scale that the stake is equivalent to the loss of the opportunity of making the conservative choice if the risky choice is made, then the former approach might be more similar to the group risk taking research. However, one might argue that on each of the items of the Choice Dilemmas Scale more is at stake than the loss of the opportunity to take the more conservative choice. It appears that the more common definition of the stake is more similar to that involved in the Choice Dilemmas Questionnaire. A new paradigm using betting scales more closely related to the Choice Dilemmas Scale might be a more useful approach. The next section of this paper discusses such an approach.

Zajonc, Wolosin, Wolosin, and Sherman (1968, 1969) and Zajonc, Wolosin, Wolosin, and Loh (1970) compared group and individual risk taking in a situation involving multiple choices between a single pair of

alternatives that differed in both the probability and amount of payoff. Expected value was held constant for all pairs of alternatives. Zajonc et al., (1968, 1969, 1970) found that when the choice was between two probabilities of winning that were similar to one another groups tended to be more conservative. When these differences were large, groups tended to be more risky. These different directions of shift in risk taking are difficult to evaluate because of possible confounding with differences between values of the prize. Zajonc et al. have developed an elaborate model to explain these results, but the usefulness of the model to explain other results in the area of group decision making is questionable. Zajonc et al. were dealing with a dynamic situation, involving feedback on success and failure, while most of the group decision making research has used a static situation (Edwards, Lindman, & Phillips, 1965). Zajonc et al.'s research is more closely related to a two-choice uncertain outcome situation (Goodnow, 1955; Kogan & Wallach, 1967d; Siegal & Goldstein, 1959), which shows that there is a close relationship between response ratios and the probability of occurrence of the two events. However, when values are concerned there is a tendency to increase expected value, and this tendency increases as the expected value increases. Further research might show that individuals alone tend more towards probability matching, while individuals in groups tend towards increasing expected value. More research on Zajonc's model will probably clarify the two-choice uncertain outcome research more than the group risk taking research to which this paper is addressed.

PROBLEM

Teger and Pruitt (1967) and Stoner (1968) demonstrated a relationship between initial risk elicited by different items before group discussion and the amount of shift that occurs on these items following group discussion. The research indicated that real life items which initially elicit greater risk induce greater shift in the risky direction, and those items which elicit the least initial risk induce a shift in the conservative direction. Other research has indicated that the values involved in the items influence the initial risk positions. Wallach and Kogan (1959, 1961) have argued, on the basis of data collected on the Choice Dilemmas Scale, that items with a high stake elicit less risk than those with a low stake, and items with a high prize elicit more risk than those with a low prize. However, direct measures of the stake and prize of the items have not been taken, and a relationship between the stake-prize combinations and shifts in risk taking has not been established. This thesis examined the proposition that the stake and prize influenced both the initial risk taken by individual subjects and the amount and direction of shift following group discussion.

Consideration of the stake and the prize was expected to clarify why some items show a shift in the risk direction, while others show a shift in the conservative direction. To explain the different directions of the risk-shift, Nordhøy (1962) has hypothesized that social values will be strengthened in the group situation. He suggested that in situations in which social values support a cautious position, a con-

servative shift will occur following group discussion, while in situations where the values support a high risk position group consideration will cause a shift in the high risk direction. Stoner (1968) has supported this notion in a study in which he attempted to measure subjects' evaluations of the high risk and low risk alternatives on real life situations. He demonstrated that where an increase in risk occurred, the high risk alternative was more acceptable than the cautious alternative. For items that showed a shift in the cautious direction, the cautious alternative was more acceptable than the high risk alternative. These results were explained by proposing that where the high risk alternative is more socially acceptable, the conversation emphasizes the high risk position. However, the results can also be explained by the fact that in the items which showed a cautious shift the stake was higher than the prize; while in items which showed a shift in the high risk direction, the prize was higher than the stake. If this can be demonstrated, social or moral values need not be invoked to explain the difference between items which differ in the direction of the shift following group discussion.

Further clarification of how this shift in risk occurs is suggested by Rettig's research on ethical risk taking. Rettig (1966a, 1966b, 1967) has shown that following group discussion an increase in risk occurs in ethical risk taking. Rettig's scale varies items by all possible combinations of high and low expected value of censure, negative reinforcement value of censure, expected value of reward, and reinforcement value of reward. He demonstrated that following group discussion the greater

differentiation between amount of shift in risk taking occurs in items varying in high and low reinforcement value of reward. From this evidence Rettig concluded that groups are primarily influenced by the reinforcement value of reward. If we can assume that the reward in ethical risk taking is fundamentally equivalent to the prize in a risk situation, then it would be predicted that groups are influenced by the prize. Furthermore, Stoner's (1968) results suggest that the relative value of the prize is the important factor in group risk taking. When the prize is greater than the stake the item has a relatively large potential reward, and consideration of the prize would presumably maximize the prize's value. For an item in which the prize is lower than the stake, consideration of the prize would presumably minimize the prize's value. This would result in a decrease in risk for items in which the prize is lower than the stake, and an increase in risk for items in which the prize is higher than the stake.

From the foregoing analysis, several predictions can be advanced. These predictions concern the performance of subjects on a scale in which they are asked to choose the lowest acceptable probability of winning before they would be willing to stake an amount of money in order to win a prize of more money. It was expected that on initial risk responses individuals are less willing to take risk the greater the stake and are more willing to take risk the greater the prize. Group discussion induces a shift in the high risk direction if the prize is higher than the stake, but a shift in the low risk direction if the prize is lower than the stake. Relative to non-discussion con-

ditions, group discussion decreases the evaluation of the prize if the prize is lower than the stake, but increases the evaluation of the prize if the prize is higher than the stake.

METHOD

Subjects

One hundred and sixty men participated in this experiment for \$1.25 and one credit towards course requirements in Introductory Psychology at the University of Alberta. The subjects were required to stake part of their \$1.25 during the experimental task.

Design

One-half of the subjects were administered a form of the questionnaire in which the prize was higher than the stake. The other half of the subjects were administered a form in which the prize was lower than the stake. In each of the two groups, one-half of the subjects were placed in a discussion condition. The other half of the subjects, who were placed in no-discussion condition, took part in a filler task instead of discussing their positions on the scale. Each of these four conditions had 40 subjects. The presentation of the items was counterbalanced, so that one-half of the subjects received the items in one order and the other half received the items in the reversed order. Most of the subjects were run in groups of four, but occasionally four subjects did not appear for the experiment. When this happened the subjects who did appear were run in a no-discussion condition and, for statistical purposes, an extra subject was later added to that group from another no-discussion session.

Within each form of the questionnaire, there were three levels of the stake. The prize was varied relative to the stake. The prize

was either $1/3$ or $2/3$ higher or lower than the stake, which meant that each prize had a relative value and an absolute value. It was expected that the absolute values of the prize would have little influence on the risk behaviour of the subjects and that the prizes would determine behaviour only according to their values relative to the stake.

Materials

Two forms of a probability acceptance scale, each form having seven items, were used. One form had prizes higher than the stakes, and the other form had prizes lower than the stakes. The first item of the scale always had a stake of \$.35, and a prize of either \$.25 or \$.45, depending upon which form of the scale was being considered. The other items had stakes of either \$.60, \$.90, or \$1.20, and for each of these stakes there was a prize which was either $2/3$ or $1/3$ distance from the stake. The prizes are shown in Table 1. The order of the items, with the exception of the first, was counterbalanced. The

TABLE 1

Values of the Prizes

	Value of Stake		
	\$.60	\$.90	\$1.20
Prize higher than stake by $1/3$	\$.80	\$1.20	\$1.60
$2/3$	\$1.00	\$1.50	\$2.00
Prize lower than stake by $1/3$	\$.40	\$.60	\$.80
$2/3$	\$.20	\$.30	\$.40

items containing prizes the same relative distance from the stake were administered together. For each item the subject was asked to select the lowest probability of winning that he would accept before he would risk the stake in order to win the prize. The subject had a choice of ten probabilities, from $1/20$ to $19/20$, in steps of $2/20$. Subjects rated the confidence they had on each choice by indicating their degree of confidence on a ten-point scale ranging from extremely confident to not confident. Both forms of the probability acceptance scale are presented in Appendix A.

On the last administration of the scale each item was followed by several other ratings. Subjects were asked to evaluate the stake in relation to the prize and also to evaluate the prize in relation to the stake. The rating response categories were labelled by the words very valuable, quite valuable, moderately valuable, slightly valuable, or of no value at all. Ratings of the chance of winning and the chance of losing were also collected. The rating response categories were labelled by the words extremely high, very high, high, low, very low, or extremely low. The rating scales are presented in Appendix B.

The filler task consisted of reading a short composition of Indian history (McNeill, 1963, pp. 298-304) and then answering questions about the interest and complexity of the composition. No actual use was made of the filler task data. The composition is presented in Appendix C.

Procedure

When subjects first entered the room they were seated around a

table and the experimenter sat at another table in a corner of the room. In front of each of the subjects was one of the two forms of the probability acceptance questionnaire. All subjects in a group received the same form of the questionnaire.

All subjects were read the following instructions.

This experiment is an attempt to look at the process by which people make decisions. The type of decision that I want to study is one in which you have to take a chance of losing something, in order to get something else. The way I am studying this is to have you stake a certain sum of money with the possibility that you will expand that money into a larger sum. If you are successful you will be able to keep the money you have staked, which we will call the stake, and also I will pay you the extra money you have won, which we will call the prize. If you are not successful you will have to give me the stake, and I will not have to give you any money. This type of decision is basically the same as is made by any person who is contemplating making an investment. The only difference is in the amount of money involved.

The experiment will take about an hour. You will receive experimental credit for the time that you participate, but I am also going to give you \$1.25, part of which you will be expected to stake in the decision making task. This will also give you the opportunity to expand the \$1.25 to quite a bit more than that. You should consider the value of the stake and prize in relation to the \$1.25. The \$1.25 is the full amount of money in your pocket, and you are going to invest some of it in order to increase this amount.

In a decision making situation in which you are going to stake money, the first decision is under what conditions you would be willing to take the chance. In some situations you might be willing to take the chance even if the chances are quite poor that you are going to win, while in other situations you would not be willing to take the chance unless the chances of winning are very good. The questionnaire that I am going to ask you to fill out will give you information on an amount of money that you are going to stake, and an amount of money you may win, if successful. Following this is a series of probabilities that you will win. You are to check off the lowest prob-

ability that you will accept before you will be willing to take the chance. If the probability of winning is any lower than this, you will not be willing to chance losing your money. For example, the first item of the questionnaire states that the stake is \$.35, and the possible prize is \$.25 (or \$.45, in the scale in which the stake is lower than the prize). Following this will be a series of probabilities from one chance in twenty of winning to nineteen chances in twenty of winning. If you answer on the questionnaire that the lowest probability of winning that you would accept is nine out of twenty, this means that you would be willing to risk the \$.35 to win another \$.25 (or \$.45), if the chance of winning was nine out of twenty or better. If the chance of winning was any lower than this, for example, three out of twenty, you would not be willing to risk the \$.35, but you would not have the chance to win the extra \$.25 (\$.45).

There will be a series of seven items on the questionnaire. Each one of these items is different from the others and should be considered separately. At the end of the experiment only one of the items you have answered will be randomly selected, and this item, and no others, will be played off. This item will be played off just once, and the result will determine the win or loss of all members of the group. The only differences in the result would be if some members were willing to play at lower probabilities than others. In this case, it is possible that some of you will play while others will not. This means that at the end of the experiment you will have the chance of winning on only one of the items you are going to answer and you have no way of knowing which one it will be.

At the end of the experiment, after the item has been selected, another random selection will be made of what your chance of winning is going to be on that item. If you have chosen as the lowest acceptable chance of winning a chance higher than what the randomly selected chance of winning is, you do not have to stake your money, but you will also have no chance of winning any more money. However, if you have chosen a chance of winning equal, or lower, than the randomly selected chance of winning, then the item will be played off with you having a chance of winning equal to the randomly selected chance of winning. If you win on this bet, I will pay you the amount that is equal to the prize of that particular item, which you will be able to keep, plus the full \$1.25 for participating in the experiment. If you lose on the item, I do not have to

pay you any extra money, and you will have to pay me the amount of money that is equal to the stake in the item. You will then be able to leave with the experimental credit, plus whatever is left of your \$1.25.

After the experimenter casually re-explained the task again to all subjects to ensure that they all understood it, the subjects filled out the scale. After all the subjects in the group had finished, those who were in a discussion condition were read the following instructions:

The reason that I had you fill out the questionnaire just now was to give you practice with the task. What I am primarily interested in, is group decision making. We find that people have many different points of view on decisions of this type, and I am interested in seeing how people react after discussing with a group the different pros and cons of taking various positions. This will also give you the opportunity to exchange information that you might not have thought about and thus increase the chances of being in the best position at the end of the experiment. So what I would like you to do is to discuss among yourselves the various pros and cons of different positions and then reach a consensus of what would be the best position to take. It will actually be one of the items on which you reach consensus which will be chosen to be played off at the end of the experiment. So remember that you are still dealing with your own money on the items on which you are going to reach group consensus. However, in this case, you will all be accepting or rejecting the opportunity to take the chance at the same probability. At the end of the experiment the same item will be played for all members of the group, and you will either all play, or not, and if you play you will all win or all lose. Remember the answers you have given previously on the questionnaire are not what I am interested in. I am interested in what your position is right now. If you have the opinions that you had before, that is all right, but do not hesitate to change them. Remember also that different people do have different reasons for answering on the questionnaire, and I would like you to discuss all the pros and cons of these positions. It is expected that you will discuss each item for about three minutes. It is important that you don't average the different positions you hold, but discuss the reasons for taking these positions and then reach a new decision. Even if you agree on what probabilities would

be acceptable, you should discuss the reasons for taking this position. Remember there are quite a few contingencies involved in the items, and you may not have considered all of them.

If subjects were in a no-discussion condition the following instructions were read to them.

Before we go on to the next part of this experiment, I would like to have you do another task which is not related to your first task. We are preparing tasks for other experiments and we are interested in obtaining reactions from people on particular prose passages. What I would like you to do is to read a short composition on Indian History and then answer questions about what you have read. There are no right or wrong answers, we are simply interested in seeing what people's reactions are to these passages.

After the subjects in the discussion conditions had reached consensus on all items they were read the following instructions.

All right now that you have discussed each of the items and reached group consensus on them, I would like you to fill out the questionnaire once more and also to answer extra questions about the items. It is possible that you have opinions about the items that you did not have before you discussed them. However, it is also possible that you do not agree exactly with the other members of your group, and would take a different position than the group consensus. It will be one of these items which, in the final analysis, will be selected for the one that will be played off at the end of the experiment. While filling out the questionnaire would you also answer the extra questions about each of the items. Remember that the answers that you have given previously on the questionnaire are not what I am interested in. I am interested in what your position is right now. If you have the same opinions that you had before that is all right, but do not hesitate to change them.

After the subjects in the no-discussion conditions had read the composition and filled out the attached questionnaire, they were read the following instructions.

Now that you have finished the task I want you to fill out the questionnaire that you first filled out and also answer extra questions about the items. I asked you to fill out the questionnaire the first time to give you practice with the task, but now I want you to do the questionnaire again to make sure you want to keep your first answers. Actually we will play off the answers you give on the questionnaire on the second administration.

After these instructions were read, the experimenter gave additional casual instructions which stressed that subjects could change their risk positions if they so wished.

When all the subjects had finished the questionnaire, one item of the scale was randomly selected and that item was played off once. The lowest probability of winning at which the selected item would be played depended upon the subject's position on that item determined from the last administration of the scale. After the item was played off, the experimenter discussed the experiment with the subjects, explaining the general experimental procedure and predictions. All subjects agreed not to discuss the experiment with friends until it was over.

RESULTS

On the initial presentation of the questionnaire it was expected that the amount of accepted risk is inversely related to the value of the stake and positively related to the value of the prize. The risk scores were equivalent to the numerator of the lowest acceptable probability that the subject was willing to accept. A high score indicated low risk.

A $2 \times 2 \times 3 \times 2$ factorial analysis of variance was performed on these scores. The first two of these factors, (1) discussion or no discussion and (2) a questionnaire with prizes either lower or higher than the stake, were assigned between subjects. The last two, the values of the stake and the distances of the prize from the stake, were assigned within subjects. A summary of the analysis of variance is reported in Table 2.

As expected, risk decreased as the stake increased ($F = 52.51$, $df = 2/312$, $p < .01^1$). The mean risk scores from the lowest to the highest stake were 10.33, 11.42, and 12.23 respectively. Duncan's Multiple Range Test showed that each of these risk means was significantly different from the other ($p < .01$).

¹The assumption of equal variance-covariance matrices might not be valid in these repeated measures analyses of variance. Therefore, the F-scores in all the following analyses of variance were evaluated by the Conservative Test (Greenhouse and Geisser, 1959). For this reason, the probability levels reported here for the stake main effects and interactions are based on $1/2$ the degrees of freedom that would have been used if the variance-covariance assumption was made. The use of the Conservative Test did not change any of the conclusions that would have been drawn from the data if the assumption of equal variance-covariance matrices was made.

TABLE 2

Analysis of Variance of Initial Risk Scores

Source	df	MS	F
Discussion (A)	1	21.00	-
Questionnaire (B)	1	1,122.34	31.59**
A x B	1	59.00	1.66
ERROR (a) ^a	156	35.53	
Prize (C)	1	55.10	5.71*
A x C	1	.34	-
B x C	1	996.34	103.30**
A x B x C	1	2.60	-
ERROR (b) ^a	156	9.64	
Stake (D)	2	290.82	52.51***
A x D	2	2.12	-
B x D	2	8.60	1.55
A x B x D	2	3.61	-
ERROR (c) ^a	312	5.54	
C x D	2	2.22	-
A x C x D	2	1.80	-
B x C x D	2	7.35	2.58
A x B x C x D	2	.31	-
ERROR (d) ^a	312	2.85	

^aFor all error terms in the analysis, groups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

* $p < .05$.

** $p < .01$.

*** $p < .01$, as determined by Greenhouse and Geisser Conservative Test, based on 1/156 df.

The expectation of a positive relationship between accepted risk and the prize predicted more acceptance of risk when the prizes are higher than the stake. It was also expected that within each questionnaire, these effects are more pronounced the greater the distance of the prize from the stake. As predicted, the analysis yielded a significant questionnaire effect ($F = 31.59$, $df = 1/156$, $p < .01$), and a significant questionnaire X prize interaction ($F = 103.30$, $df = 1/156$, $p < .01$). When the prize was lower than the stake, less risk was elicited than when the prize was higher than the stake, but this effect was more pronounced, the greater the distance of the prize from the stake. The questionnaire X prize interaction is shown in Figure 1. The mean risk scores for the questionnaire and questionnaire X prize interaction are presented in Table 3.

TABLE 3
Mean Initial Risk Scores

	Distance of Prize From Stake		Means
	1/3	2/3	
Prize			
Higher than stake	11.02	9.47	10.25
Lower than stake	11.15	13.67	12.41

The only other significant effect within the analysis was a significant prize effect ($F = 5.71$, $df = 1/156$, $p < .05$), which indicated that the prizes that were $1/3$ distance from the stake elicited more risk than those which were $2/3$ distance from the stake. This effect was not considered important for interpretation purposes because it merely indicated that the effect of the prize being $2/3$ lower than the stake was greater than its being $2/3$ higher than the stake.

The change from initial risk score was derived by computing the difference between the initial risk score and the subsequent risk score. If the change was in the direction of higher risk a plus sign was given

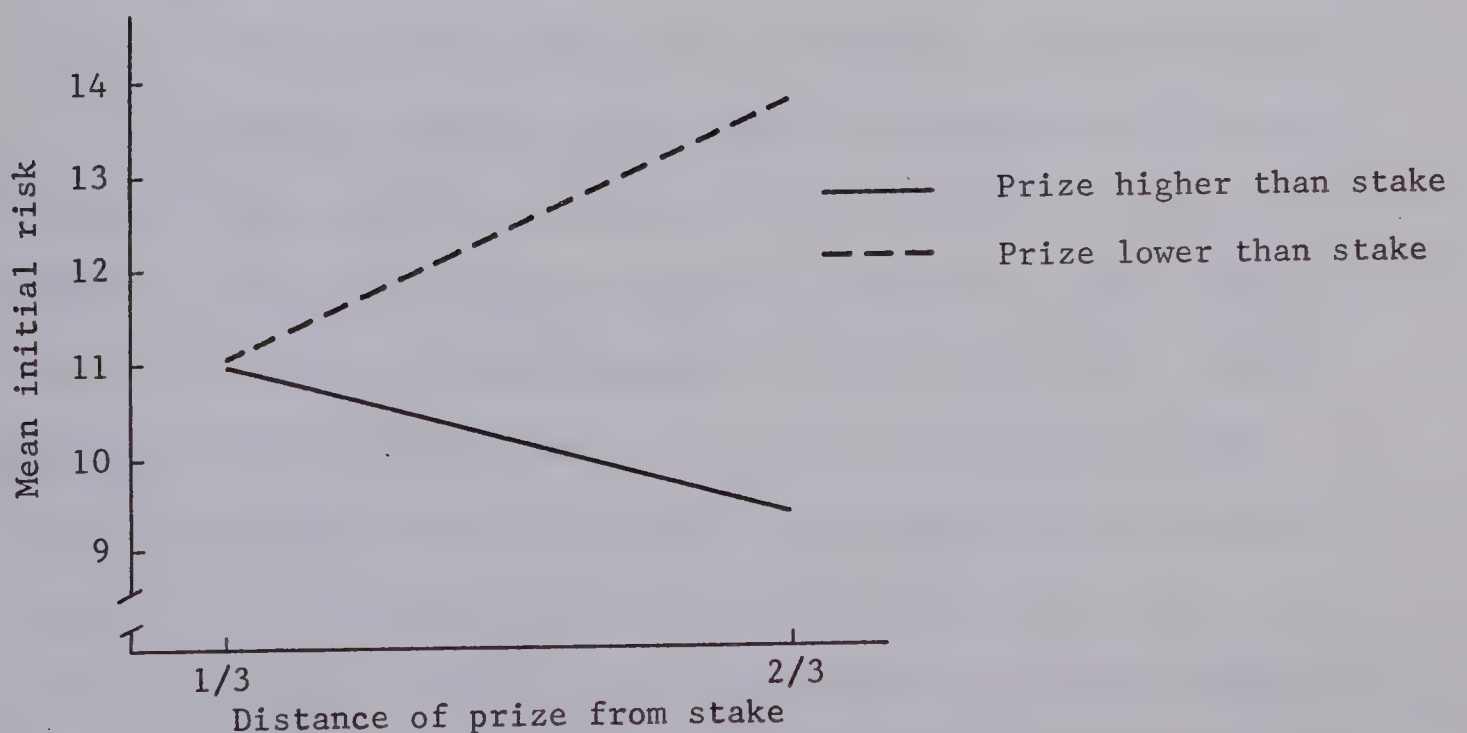


FIG. 1. Mean initial risk scores in questionnaire X prize interaction.

to the difference score, and if the change was in the direction of lower risk the difference score was assigned a negative sign.

Analyses were done on both the amount of shift from the first administration of the questionnaire to the consensus decision reached by discussion subjects and from the first to the last administration of the questionnaire. It was expected that discussion elicits a shift in the high risk direction for prizes higher than the stake and in the low risk direction for prizes lower than the stake. It was also expected that on both of these sets of data, discussion elicits more shift in risk taking the greater the distance of the prize from the stake.

A $2 \times 3 \times 2$ analysis of variance was computed for the shift score on the consensus decisions. Since only discussion subjects reached consensus, non-discussion subjects were not included in this analysis. The analysis included two questionnaires assigned between subjects, and three levels of the stake and two levels of the prize assigned within subjects. A summary of the analysis is presented in Table 4. The analysis did not confirm a significant questionnaire effect or a significant questionnaire X prize interaction. A significant stake effect ($F = 4.43$, $df = 2/36$, $p < .05$) was the only significant result from this analysis. The mean increase in risk scores, from the lowest stake to the highest stake, were $+.95$, $+.41$, and $-.17$. Duncan's Multiple Range Test indicated that the increase in risk score for the low stake was significantly greater than the increase in risk score for the high stake ($p < .05$). It appears from this

TABLE 4

Analysis of Variance of Consensus Shift Scores

Source	df	MS	F
Questionnaire (A)	1	7.01	-
ERROR (a) ^a	78	38.72	
Prize (B)	1	90.13	3.03
A x B	1	.13	-
ERROR (b) ^b	18	28.37	2.93*
ERROR (c)	60	9.67	
Stake (C)	2	50.08	4.43**
A x C	2	2.38	-
ERROR (d) ^b	36	11.31	2.24*
ERROR (e)	120	5.04	
B x C	2	4.04	-
A x B x C	2	5.84	-
ERROR (f) ^b	36	6.51	2.15*
ERROR (g)	120	3.03	

^aGroups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

^bGroups within treatments was significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments was used as the error term.

* $p < .05$.

** $p < .05$, as determined by Greenhouse and Geisser Conservative Test, based on 1/18 df.

analysis that in the shifts occurring under group consensus conditions, the direction and amount of shift in risk taking is determined by the stake rather than the prize.

A $2 \times 2 \times 3 \times 2$ analysis of variance, with the same factors as those used for the initial risk scores, was computed for the shift scores from the first to the last administration of the questionnaire. A summary of this analysis is presented in Table 5. There was a significant questionnaire effect ($F = 5.35$, $df = 1/156$, $p < .05$), but this effect was not modified by either discussion or the distance of the prize from the stake. When the prize was lower than the stake, subjects shifted in the conservative direction, and when the prize was higher than the stake, subjects shifted in the high risk direction. The mean shifts for the relatively low prize and the relatively high prize conditions were $-.47$ and $+.19$ respectively. There was also a significant discussion effect ($F = 4.08$, $df = 1/156$, $p < .05$), with no discussion groups shifting in the conservative direction and discussion groups shifting in the high risk direction. The means for discussion and no-discussion groups were $+.15$ and $-.42$, respectively. No other effects within this analysis were significant.

In order to examine the process underlying change in risk positions, the evaluation of the stake and prize were rated subsequent to probability acceptance responses on the last administration of the scale. On these rating scales subjects sometimes marked the scale in the space in which the adjective was printed and at other times marked on the line that separated the intervals. Ratings within the intervals

TABLE 5

Analysis of Variance of Post-Discussion Shift Scores

Source	df	MS	F
Discussion (A)	1	79.35	4.08*
Questionnaire (B)	1	104.02	5.35*
A x B	1	8.07	-
ERROR (a) ^a	156	19.43	
Prize (C)	1	21.60	1.96
A x C	1	20.42	1.86
B x C	1	28.02	2.55
A x B x C	1	26.67	2.43
ERROR (b) ^b	36	10.99	1.80*
ERROR (c)	120	6.11	
Stake (D)	2	3.26	-
A x D	2	5.97	1.35
B x D	2	3.16	-
A x B x D	2	2.24	-
ERROR (d) ^a	312	4.43	
C x D	2	5.93	1.18
A x C x D	2	.23	-
B x C x D	2	16.38	3.27
A x B x C x D	2	1.80	-
ERROR (e) ^b	72	5.01	1.55*
ERROR (f)	240	3.23	

^aGroups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

^bGroups within treatments was significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments was used as the error term.

* $p < .05$.

were scored as 2, 4, 6, 8, or 10; and those on the lines were scored as 1, 3, 5, 7, 9, or 11. A high score indicated a high evaluation of the stake or prize.

Since the relative value of the prize was expected to influence the discussion subjects, it was expected that subjects in discussion conditions more highly evaluate prizes higher than the stake and less highly evaluate prizes lower than the stake. However, the obtained shift data suggested that the stake strongly influenced discussion subjects, so that a discussion X stake interaction in the evaluation of the stake would be more consistent with the shift data.

A $2 \times 2 \times 3 \times 2$ analysis of variance, with the same factors as on the analysis of initial risk scores, was performed on the evaluations of the prize. A summary of this analysis is presented in Table 6. The expected significant discussion X questionnaire interaction was not found, but a discussion effect was found ($F = 14.13$, $df = 1/156$, $p < .01$), with discussion subjects reporting a higher evaluation of the prize than no discussion subjects. The mean evaluations of the prize for discussion and no-discussion conditions were 6.96 and 6.25 respectively. There was also a significant interaction between discussion and the stake ($F = 7.53$, $df = 2/312$, $p < .01$), indicating that the evaluation of the prize increased more as the stake increased for discussion conditions than it did for non-discussion conditions. For discussion conditions, the mean evaluations of the prize, from the lowest stake to the highest stake, were 6.09, 6.93, and 7.87, whereas for no discussion conditions the same evaluations were 5.61, 6.34, and

TABLE 6

Analysis of Variance of Evaluations of the Prize

Source	df	MS	F
Discussion (A)	1	123.98	14.13*
Questionnaire (B)	1	376.25	42.89*
A x B	1	1.43	-
ERROR (a) ^a	156	8.77	
Prize (C)	1	39.61	15.35*
A x C	1	.05	-
B x C	1	361.38	140.06*
A x B x C	1	4.13	1.60
ERROR (b) ^a	156	2.58	
Stake (D)	2	173.56	155.86**
A x D	2	8.38	7.53**
B x D	2	2.50	2.25
A x B x D	2	2.61	2.35
ERROR (c) ^a	312	1.11	
C x D	2	8.73	11.51**
A x C x D	2	1.19	1.56
B x C x D	2	11.38	15.02**
A x B x C x D	2	.19	-
ERROR (d) ^a	312	.76	

^aFor all error terms in the analysis, groups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

* $p < .01$.

** $p < .01$, as determined by Greenhouse and Geisser Conservative Test, based on 1/156 df.

6.78. An interpretation of this effect is suggested when the results on the evaluations of the stake are considered.

As would be expected from the relative values of the prize, this analysis also yielded a significant questionnaire effect ($F = 42.89$, $df = 1/156$, $p < .01$) and a significant questionnaire X prize interaction ($F = 140.06$, $df = 1/156$, $p < .01$). When the prize was lower than the stake, it elicited a lower evaluation of the prize than when the prize was higher than the stake. This effect was more pronounced when the prize was 2/3 distance from the stake than when it was 1/3 distance. The means from the questionnaire effect and the questionnaire X prize interaction are shown in Table 7. The questionnaire X prize interaction is plotted in Figure 2.

There was also a significant prize effect ($F = 15.35$, $df = 1/156$, $p < .01$) which indicated that the effect of the prize being 2/3 lower than the stake was greater than its being 2/3 higher than the stake. This was consistent with the same effect found in the initial risk scores, but provides no information of theoretical significance.

Because the objective expected value was the same for all three stakes within each of the questionnaire and prize combinations, no stake effects in the evaluations of the stake and prize were expected. However, the analysis yielded several significant stake effects. As the stake decreased the evaluation given to the prize also decreased ($F = 155.86$, $df = 2/312$, $p < .01$). The mean evaluations of the

TABLE 7
Mean Evaluations of the Prize

	Value of Stake			Means
	\$.60	\$.90	\$1.20	
Prize higher than stake by 1/3	5.90	7.06	7.50	6.82
2/3	6.86	7.61	8.45	7.64
Mean				7.23
Prize lower than stake by 1/3	5.86	6.66	7.86	6.80
2/3	4.79	5.21	5.49	5.16
Mean				5.98

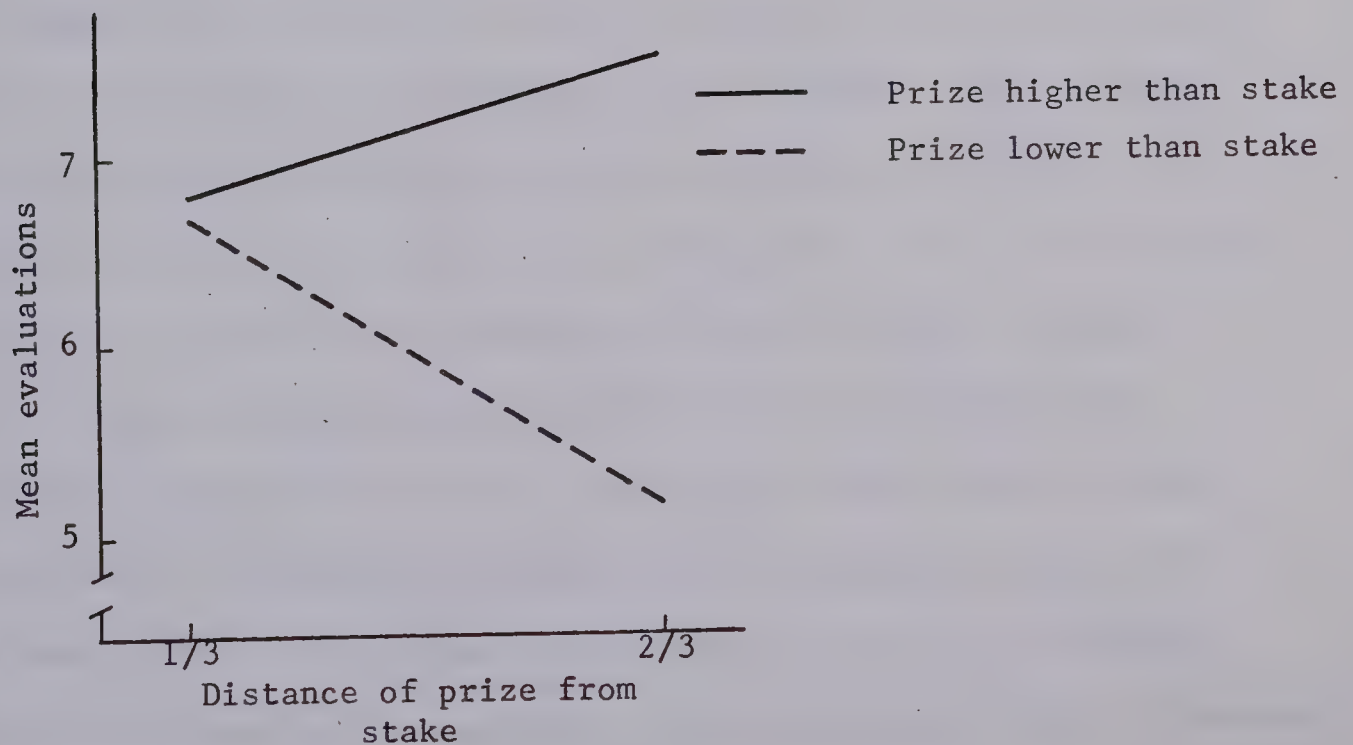


FIG. 2. Mean evaluation of the prize in questionnaire X prize interaction.

prize for the lowest to the highest stake were 5.85, 6.64, and 7.32, respectively. A Duncan's Multiple Range Test indicated that each of these means was significantly different ($p < .01$) from one another.

A significant prize X stake interaction was found ($F = 11.51$, $df = 2/312$, $p < .01$). The interpretation of this interaction depended upon the higher order prize X stake X questionnaire interaction that was also found ($F = 15.02$, $df = 2/312$, $p < .01$). The mean evaluation scores for this interaction are contained in Table 7 and are plotted in Figure 3. On the questionnaire which contained prizes lower than the stakes, the influence of the stake in evaluating the prize was greater when the prize was 1/3 distance from the stake, than when the prize was 2/3 distance from the stake. On the questionnaire which contained prizes higher than the stakes, the stake had an influence on the evaluation of the prize, regardless of the distance of the prize from the stake. This is why in the stake X prize interaction the stake mediated a greater evaluation of the prize for those prizes which were close to the stake than for those which were further away from the stake. These stake effects are what would be expected if the subjects were evaluating the absolute values of the prize rather than the relative values. Although the questionnaire was phrased to have the subjects evaluate the prizes relative to the stakes, the subjects were still primarily influenced by the absolute money values concerned. Evaluating the relative money values was apparently a difficult task.

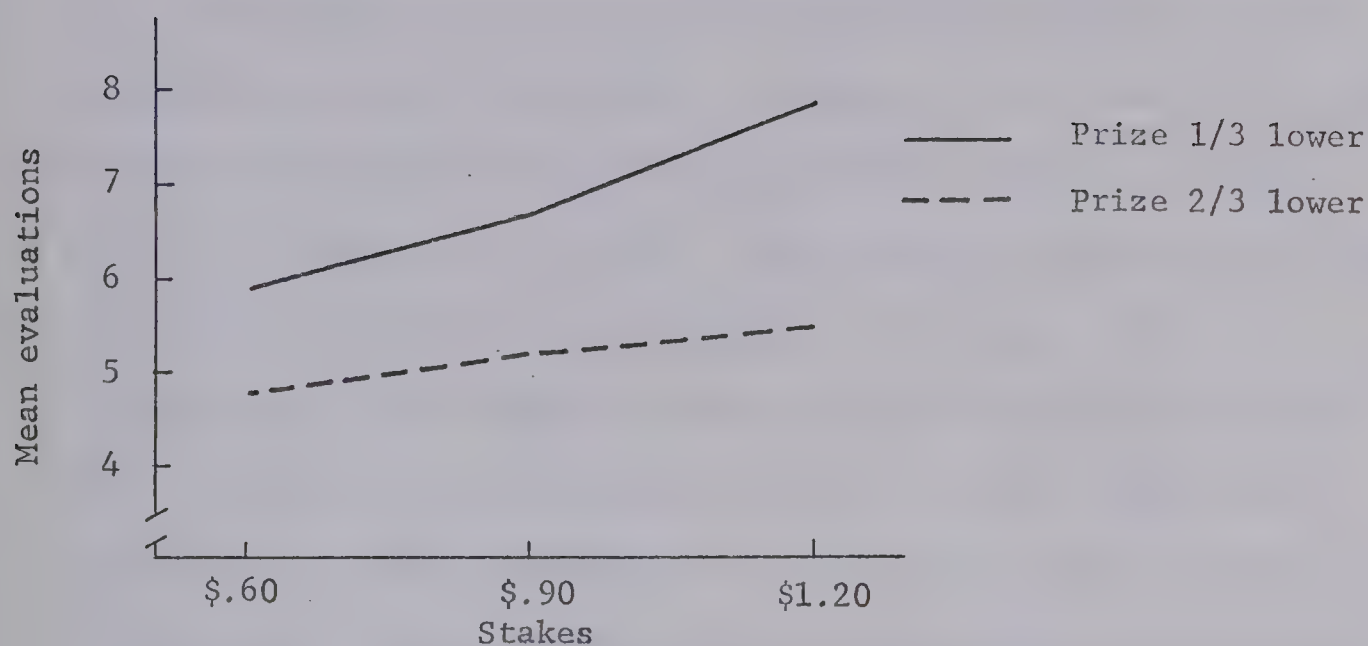


FIG. 3a. Mean evaluations of the prize when the prize is lower than the stake.

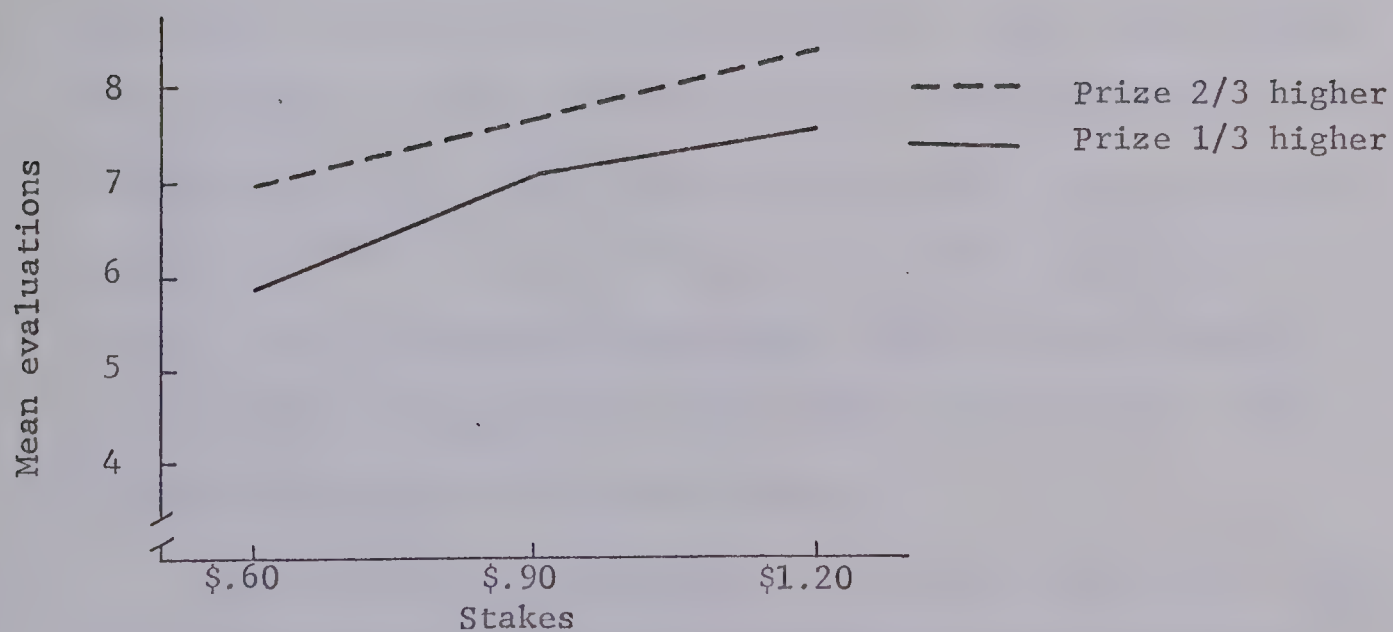


FIG. 3b. Mean evaluations of the prize when the prize is higher than the stake.

FIG. 3. Mean evaluations of the prize in questionnaire X prize X stake interaction.

A $2 \times 2 \times 3 \times 2$ analysis of variance, with the same factors as on the analysis of initial risk scores was computed for the evaluations given to the stake. A summary of this analysis is presented in Table 8. A significant discussion effect was found ($F = 5.73$, $df = 1/156$, $p < .05$). The stake was evaluated more highly following discussion than following no discussion. The mean evaluations of the stake for discussion and no discussion groups was 7.48 and 6.95, respectively. There was also a significant discussion X stake interaction ($F = 10.92$, $df = 2/312$, $p < .01$). As the stake increased the difference between the discussion and no discussion groups also increased. For discussion conditions, the mean evaluations of the stake, from the lowest to the highest, were 6.19, 7.49, and 8.77, whereas for no discussion conditions the same evaluations were 6.05, 7.01, and 7.81. The means are plotted in Figure 4. These data are consistent with the interpretation that discussion groups are more strongly influenced by the stake than by the prize. This interaction is similar to the previously reported stake X discussion interaction in the evaluations of the prize. The subjects were more highly evaluating the stakes of higher value, and perhaps to justify their risk taking on these items also evaluated the prizes highly.

As would be expected from the relative values of the prize, there was also a significant questionnaire effect ($F = 12.00$, $df = 1/156$, $p < .01$), indicating that the stake was more highly eval-

TABLE 8

Analysis of Variance of Evaluations of the Stake

Source	df	MS	F
Discussion (A)	1	67.73	5.73*
Questionnaire (B)	1	141.83	12.00**
A x B	1	.46	-
ERROR (a) ^a	156	11.82	
Prize (C)	1	5.55	3.85
A x C	1	1.75	1.22
B x C	1	18.98	13.18**
A x B x C	1	1.75	1.22
ERROR (b) ^a	156	1.44	
Stake (D)	2	375.41	303.31***
A x D	2	13.52	10.92***
B x D	2	.06	-
A x B x D	2	3.58	2.90
ERROR (c) ^a	312	1.24	
C x D	2	4.68	7.89***
A x C x D	2	.89	1.50
B x C x D	2	1.25	2.10
A x B x C x D	2	1.43	2.41
ERROR (d) ^a	312	.59	

^a Groups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

* $p < .05$.

** $p < .01$.

*** $p < .01$, as determined by Greenhouse and Geisser Conservative Test, based on 1/156 df.

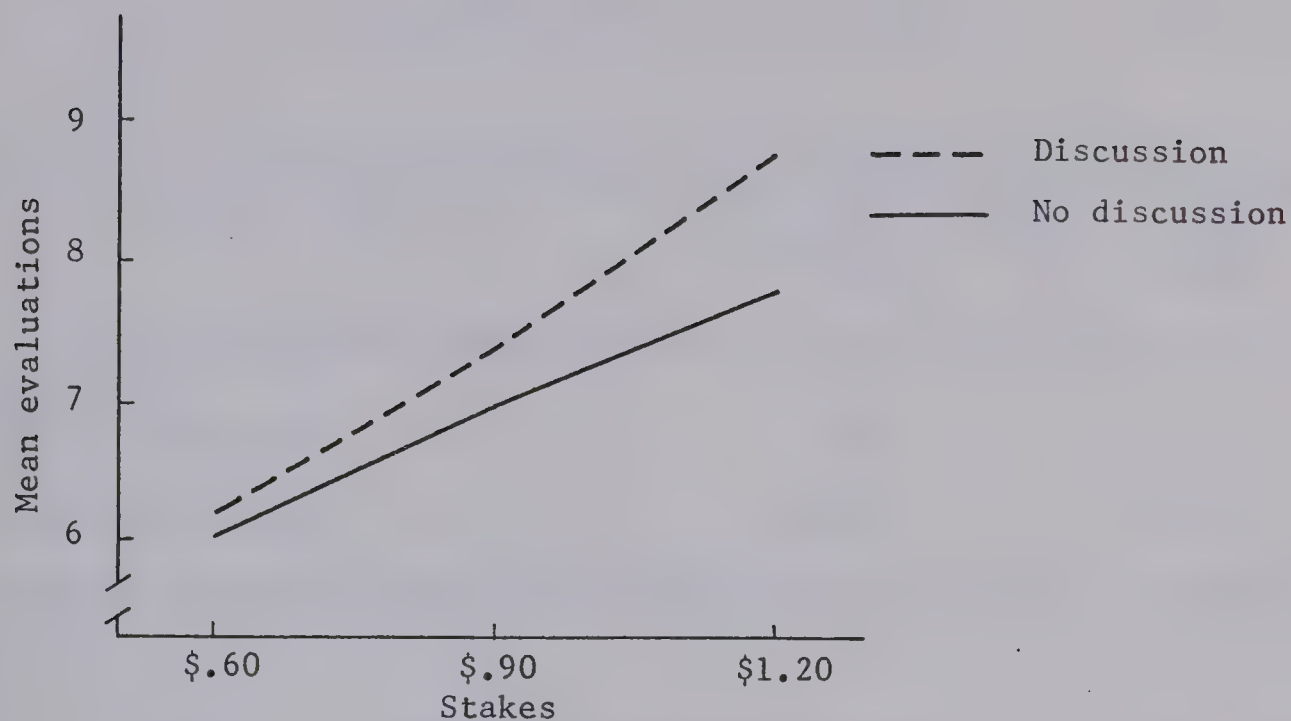


FIG. 4. Mean evaluations of the stake for discussion and no discussion conditions.

uated when the prize was lower than the stake, than when the prize was higher than the stake. The mean stake evaluations of the two questionnaires were 7.60 and 6.83. There was also a significant questionnaire X prize effect ($F = 13.18$, $df = 1/156$, $p < .01$). The mean stake evaluations for this interaction are presented in Table 9 and plotted in Figure 5. The data indicated that the difference between the two questionnaires was greatest when the prize was $2/3$ distance from the stake.

TABLE 9

Mean Evaluations of the Stake

	Distance of Prize from Stake	
	1/3	2/3
Prize		
Higher than stake	6.90	6.77
Lower than stake	7.39	7.82

As would be expected if the absolute values of the stake were influencing the subjects' responses, an increase in the stake also caused an increase in the evaluation given to the stake ($F = 303.31$, $df = 2/312$, $p < .01$). The mean evaluations given to the stakes from the lowest stake to the highest stake were 6.13, 7.25, and 8.29 respectively. Duncan's Multiple Range Test indicated that these means were each significantly different from one another ($p < .01$).

A significant stake X prize interaction ($F = 7.89$, $df = 2/312$, $p < .01$) was also found. On items in which the prize was close to the stake the mean evaluations, from the lowest to the highest stake were 5.92, 7.19, and 8.32, respectively. For those items in which the prize was further from the stake the mean evaluations, from the lowest to the highest stake, were 6.32, 7.31, and 8.25. A Duncan's Multiple Range Test indicated that when the prize was further away from the

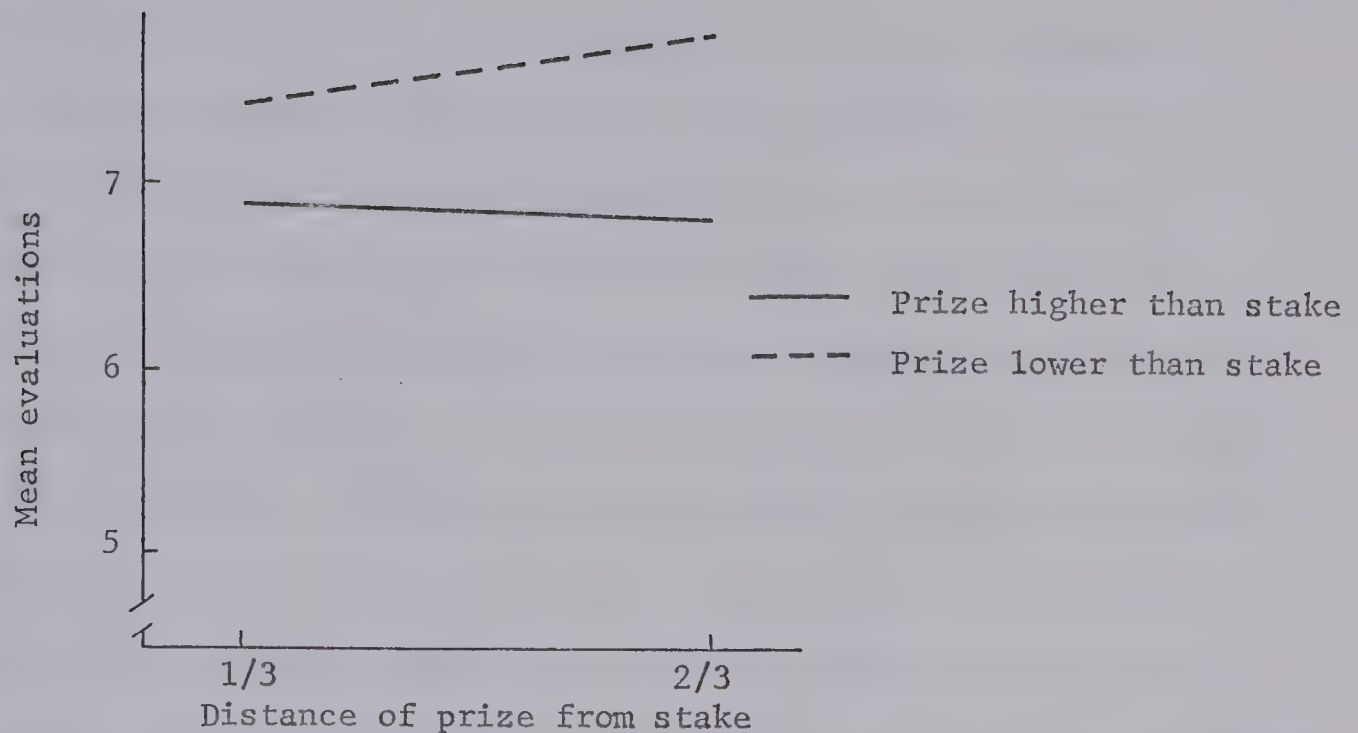


FIG. 5. Mean evaluations of the stake in questionnaire X prize interaction.

stake, the stake was evaluated higher than when the prize was nearer the stake for items where the stake was \$.60 ($p < .01$). When the stake was equal to \$.90 or \$1.20, no difference between the two prize levels was found. This result is difficult to interpret. If subjects evaluate the stakes on the basis of the relative values of the prizes, the effects of the prize levels should cancel one another because the prizes are the same distance on either side of the stake. As expected, no differences between prize levels occurred on the two higher stake levels. However, this did not occur when the stake was \$.60. In absolute value terms this is the item in which the stake is closest to the prize. When the absolute values of the stake and prize are close together it appears to be difficult for the subjects to make a

judgment in terms of the relative values of the stake and prize.

The actual risk taking scores on the probability acceptance scale yielded significant differences between conditions. An analysis of the evaluations of these risk taking positions on the scale was performed to examine the subjects' subjective evaluations of their risk taking behavior. In evaluating the probability of winning and the probability of losing the subjects were evaluating their responses on the risk acceptance scale. A relationship between the experimental conditions and these evaluations must be interpreted by an examination of the subjects' responses on the risk taking scale.

The ratings were scored in the same way as those in the evaluations of the stake and prize. Ratings within the intervals were scored as 2, 4, 6, 8, 10, or 12; and those on the lines were scored as 1, 3, 5, 7, 9, 11, or 13. A high score indicated greater chance of winning on that item.

A $2 \times 2 \times 3 \times 2$ analysis of variance with the same factors as were used in analysing the initial risk scores was computed on the ratings of the probability of winning. A summary of this analysis is presented in Table 10. As the amount of accepted risk increased, the subjects had a greater chance to play the game. Since they have to play the game to win, the acceptance of more risk, from one point of view, means that they have a greater chance of winning the prize. However, they must also accept a lesser probability of winning in order to have a better chance of playing the game. If the subjects are more influenced by the prospects of winning, greater risk would mean greater

TABLE 10

Analysis of Variance of Evaluations of Probability of Winning

Source	df	MS	F
Discussion (A)	1	1.84	-
Questionnaire (B)	1	48.60	6.28*
A x B	1	2.02	-
ERROR (a) ^a	156	7.73	
Prize (C)	1	.70	-
A x C	1	.10	-
B x C	1	13.07	6.44*
A x B x C	1	9.60	4.73*
ERROR (b) ^a	156	2.03	
Stake (D)	2	33.53	18.16**
A x D	2	4.09	2.21
B x D	2	.34	-
A x B x D	2	.90	-
ERROR (c) ^a	312	1.85	
C x D	2	.47	-
A x C x D	2	.05	-
B x C x D	2	.62	-
A x B x C x D	2	1.61	1.99
ERROR (d) ^a	312	.81	

^aFor all error terms in the analysis groups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

* $p < .05$.

** $p < .01$, as determined by Greenhouse and Geisser Conservative Test, based on 1/156 df.

evaluation of winning. But if they are influenced by the prospects of losing, greater risk would mean a lesser evaluation of the prospects of winning. The data on the evaluations of the probability of winning indicated that an increase in risk was viewed as a decrease in the chance of winning, which suggests that the subjects were more influenced by the prospects of losing than by the prospects of winning.

A significant stake effect ($F = 18.16$, $df = 2/312$, $p < .01$) was found. Since the subjects decreased in risk as the stake increased, these results indicated that the subjects perceived their decrease in risk as an increase in the probability of winning. The mean evaluations of the probability of winning from the lowest stake to the highest stake, were 7.11, 7.49, and 7.75 respectively. A Duncan's Multiple Range Test indicated that all these ratings were significantly different from one another ($p < .05$).

There was also a significant questionnaire ($F = 6.28$, $df = 1/156$, $p < .05$), and questionnaire X prize ($F = 6.44$, $df = 1/156$, $p < .05$) effect. In the questionnaire in which the prize was lower than the stake, subjects rated their chance of winning higher than in the questionnaire in which the prize was higher than the stake. The respective mean evaluations of the probability of winning were 7.67 and 7.22. This effect was more pronounced the greater the distance the prize was from the stake. The mean probability of winning ratings for this interaction are shown in Table 11, and plotted in Figure 6.

TABLE 11

Evaluations of Chance of Winning

	Discussion	No Discussion	Means
Prize higher than stake by $1/3$	7.26	7.47	7.37
$2/3$	7.19	6.97	7.08
Prize lower than stake by $1/3$	7.58	7.58	7.58
$2/3$	7.58	7.94	7.76

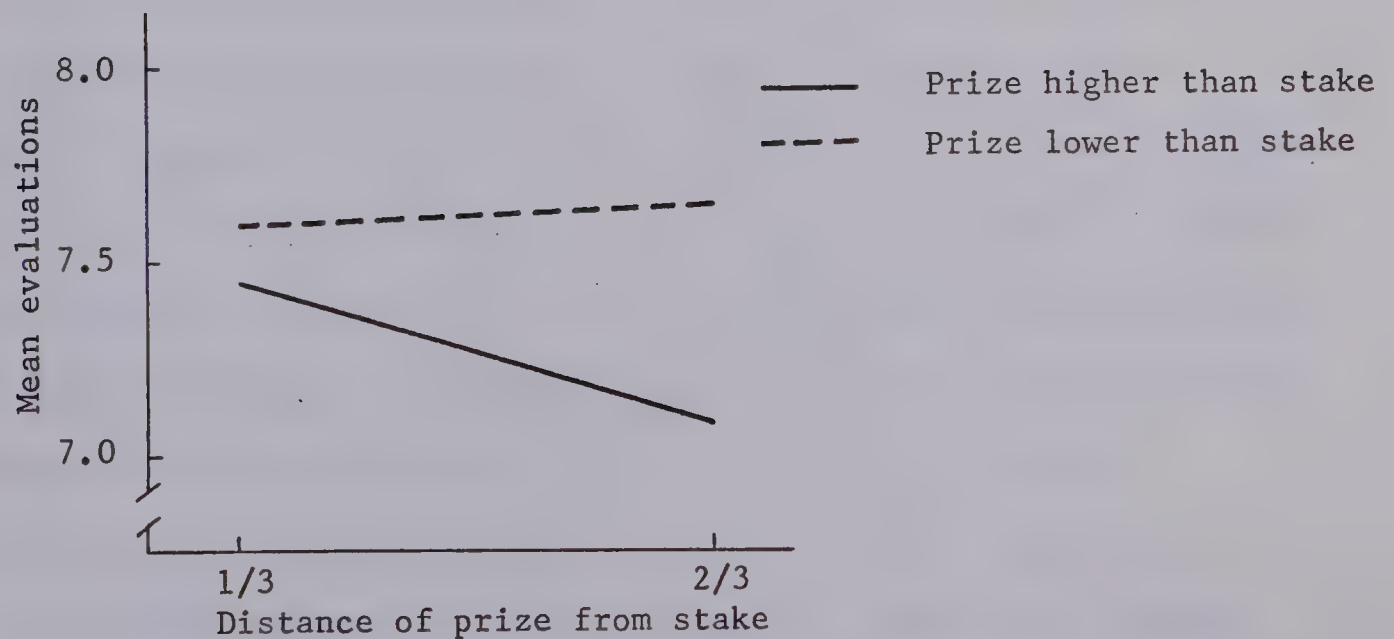


FIG. 6. Mean evaluations of chance of winning in questionnaire X prize interaction.

As in the case of the stake effects, these results indicated that subjects perceived a decrease in the acceptance of risk as an increase in the probability of winning.

An unexpected finding was a significant questionnaire X prize X discussion interaction ($F = 4.73$, $df = 1/156$, $p < .05$). The mean evaluations of the probability of winning for this interaction are shown in Table 11. These means indicate that there was little difference between different levels of the prize under discussion conditions. In comparison, under no discussion conditions, the differences between prizes that were 1/3 and 2/3 distance from the stake were much greater. It appears that discussion distracted the subjects from the prize and its connection to their risk taking and the probability of winning.

A $2 \times 2 \times 3 \times 2$ analysis of variance, also with the same factors as in the analysis of the initial risk scores, was computed for the evaluations of the probability of losing. A summary of this analysis is shown in Table 12. It was expected that the subjects would rate their probability of losing higher, the greater amount of risk they were willing to accept. Subjects had been willing to accept less risk the higher the stake. As expected, a greater stake elicited a smaller evaluation of losing ($F = 12.67$, $df = 2/312$, $p < .01$). The mean evaluations of losing for the largest to the smallest stake were 6.33, 6.56, and 6.85 respectively. Duncan's Multiple Range Test indicated that all the means were significantly different from one another

TABLE 12

Analysis of Variance of Evaluations of Probability of Losing

Source	df	MS	F
Discussion (A)	1	1.67	-
Questionnaire (B)	1	102.70	14.34*
A x B	1	1.50	-
ERROR (a) ^a	156	7.16	
Prize (C)	1	3.50	1.51
A x C	1	1.50	-
B x C	1	33.75	14.51*
A x B x C	1	5.40	2.32
ERROR (b) ^a	156	2.33	
Stake (D)	2	22.18	12.67**
A x D	2	1.88	1.08
B x D	2	.36	-
A x B x D	2	.11	-
ERROR (c) ^a	312	1.75	
C x D	2	.54	-
A x C x D	2	.20	-
B x C x D	2	.07	-
A x B x C x D	2	.96	1.14
ERROR (d) ^a	312	.84	

^aFor all error terms in the analysis groups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

* $p < .01$.

** $p < .01$, as determined by Greenhouse and Geisser Conservative Test, based on 1/156 df.

($p < .05$).

A significant questionnaire effect ($F = 14.34$, $df = 1/156$, $p < .01$) indicated that the evaluation of the probability of losing was smaller when the prize was lower than the stake, and it was higher when the prize was higher than the stake. The respective mean evaluations were 6.25 and 6.91. A significant questionnaire X prize interaction ($F = 14.51$, $df = 1/156$, $p < .01$) indicated that this effect was greater the greater the distance the prize was from the stake. The mean ratings of the probability of losing for this interaction are shown in Table 13 and plotted in Figure 7.

No other significant results were found in this analysis.

The reason the subjects are more likely to shift their risk taking positions on certain items might be due to differing degrees of

TABLE 13

Mean Evaluations of Chance of Losing

	Distance of Prize from Stake	
	1/3	2/3
Prize		
Higher than stake	6.66	7.15
Lower than stake	6.38	6.12

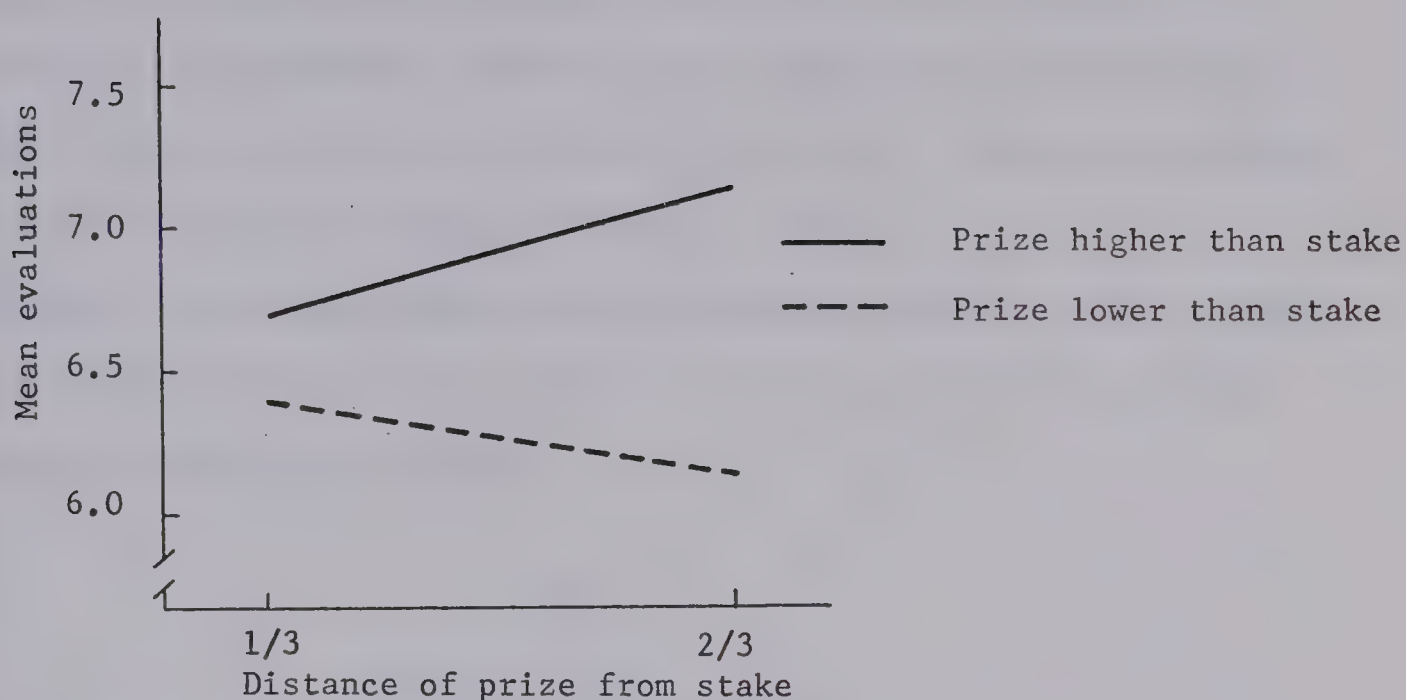


FIG. 7. Mean evaluations of chance of losing in questionnaire X prize interaction.

confidence on various items. For this reason confidence ratings were taken for each item on the first and last administration of the questionnaires. A metric ruler was used to measure the distance from the beginning of the rating scale to the point marked by the subject to indicate his degree of confidence. The range of possible confidence scores was 0-167, with high scores indicating greater confidence. Two subjects had not marked their degree of confidence on one of the items, and those subjects were dropped from the analysis. A $2 \times 2 \times 3 \times 2$ unweighted means solution (Wiener, 1962), with the same levels as already described for the initial risk scores was done on the confidence

scores. A summary of this analysis is presented in Table I of Appendix D. The analysis demonstrated a significant questionnaire X prize interaction ($F = 5.42$, $df = 1/154$, $p < .05$). The mean confidence ratings for this interaction are shown in Table 14. These means indicate that subjects were more confident the lower the prizes, which is equivalent to saying that subjects were more confident on items on which lower risk was taken.

TABLE 14
Mean Confidence Ratings

	Value of Stake			Means
	\$.60	\$.90	\$1.20	
Prize higher than stake by 1/3	102.73	111.01	109.54	107.76
2/3	102.72	99.14	101.61	101.16
Prize lower than stake by 1/3	110.28	109.92	107.68	109.29
2/3	110.05	106.87	114.08	110.33

There was also a stake X prize interaction ($F = 5.74$, $df = 2/308$, $p < .05$), which indicated that subjects were most confident when they were dealing with a stake of \$.90 and a prize that

was 1/3 distance from the stake, but they were least confident with the same stake when it had a prize 2/3 distance from the stake. All other means were approximately the same. The mean confidence ratings from the lowest to the highest stake, when the prize was 1/3 distance from the stake, were 106.51, 110.47, and 108.61, respectively. When the prize was 2/3 distance from the stake, the mean confidence ratings from the lowest to the highest stake, were 106.39, 103.01, and 107.84, respectively. Duncan's Multiple Range Test (Kramer, 1956) indicated that the mean confidence rating for the stake of \$.90 combined with the prize 2/3 distance from the stake was significantly lower than all the other means ($p < .05$).

The above results must be interpreted in view of a significant questionnaire X prize X stake interaction ($F = 4.94$, $df = 2/308$, $p < .05$). The mean confidence ratings of this interaction are shown in Table 14. These data suggested that the subjects were more confident in their risk taking positions as the amount of risk they were accepting decreased. They also suggested that subjects were more influenced in their confidence ratings by the absolute values of the stake and prize combinations than by the relative values of these combinations.

It was expected that for items on which shift in risk occurred there was also a shift in the amount of confidence. Change in confidence scores was calculated by assigning to the difference between the first and last administration of the scale a plus sign if the difference was in the direction of greater confidence and a minus sign if the difference was

in the direction of less confidence. There were seven subjects for whom scores were missing and these subjects were dropped from the analysis. A $2 \times 2 \times 3 \times 2$ unweighted means solution yielded no significant effects. A summary of this analysis is presented in Table II of Appendix D.

Another possible criterion of the certainty with which subjects held their positions is the amount of time the subjects took to perform the various tasks. While the subjects were performing their tasks the experimenter timed with a stop-watch the amount of time they took to complete each task. A $2 \times 3 \times 2$ analysis of variance, with the two questionnaires, three levels of the stake, and two levels of prize was computed for the amount of time, in minutes, it took the groups to reach consensus on each item. A summary of this analysis is presented in Table III of Appendix D. There was no significant effects, but there was a tendency ($F = 3.83$, $df = 2/36$, $p < .10$) for the smaller stake to elicit less conversation. The mean number of minutes for the smallest to the largest stake were 1.64, 2.56, and 2.68 respectively. The tendency to take more time the larger the stake is consistent with the smaller shift on these items. It appeared from these data that the subjects are less definite on the amount of risk to take, the greater the value of the stake.

A 2×2 analysis of variance, with two levels of discussion and two questionnaires, for the number of minutes taken to complete the initial administration of the questionnaire showed no significant effects. A summary of the analysis is presented in Table IV of

Appendix D. When the same analysis of variance was computed for the amount of time it took subjects to complete the last administration of the questionnaire, a significant discussion effect was found ($F = 9.05$, $df = 1/36$, $p < .01$). A summary of this analysis is presented in Table V of Appendix D. The mean time scores indicated that subjects in discussion conditions took 6.22 minutes and subjects in no discussion conditions took 7.32 minutes to complete the last administration of the questionnaire. These data indicated that the subjects who had discussed their positions were more confident in filling out the questionnaire. On the analysis of the amount of time to complete the last administration of the scale, no other significant effects were found.

DISCUSSION

The expectation that initial risk acceptance is positively related to the prize and negatively related to the stake, was confirmed. There were no interaction effects between the stake and the prize in the initial risk taking scores, which indicated that the stake and prize determined risk behaviour independently of one another. When the prize was considered, the prize relative to the stake influenced risk taking, but the absolute monetary values of the prizes did not influence the subjects' responses. The absolute values of the stakes did, however, have an influence on the subjects' initial risk taking. Kogan and Wallach (1967d), from their review of the risk taking literature, suggested that in initial risk taking, the stake has more influence than the prize. This tendency is confirmed by these data. Taking the chance of losing twice as much was not compensated for by a possibility of winning twice as much. The subjects preferred to keep the money they had than to risk it to win more, and this tendency increased as the stake increased.

Teger and Pruitt's (1967) data in which a correlation was found between items which elicited high initial risk scores and items which elicited the risky shift, suggested that the group-induced shift in risk taking was mediated by the stake and prize. In this study, analysis of the consensus shift scores did not support Rettig's suggestion (1966a, 1966b) that groups are influenced by the prize, but rather the data supported the conclusion that group consensus decisions are influenced by the stake. When the stake was high there

was a shift in the conservative direction, but as the stake decreased the degree of shift in the risky direction increased. Further support for the contention that the stakes determine the degree of shift in the high risk direction in consensus decisions can be gleaned from Pruitt and Teger's (1969) data. Pruitt and Teger did not analyse their items individually, but in their stake preference items, as the stakes increased, there was less shift in the risky direction.

The influential effect of the stake in consensus decisions was not sustained after the discussion. But in Pruitt and Teger's study (1969) post-discussion data were not collected, so it is not known if the apparent effect in their data was sustained following group discussion. However, in the present study, shifts in risk taking which were not mediated by the stake did occur in the post discussion scores.

A discussion main effect that was not influenced by either the stake or the prize was found in the shift scores for the last administration of the questionnaire. These data suggested that discussion leads to a general increase in risk which is not mediated by the stake or the prize. The fact that this discussion effect was primarily caused by a conservative shift for non-discussion subjects, may be due to a conservative tendency on the experimental items, which was simply enhanced in the non-discussion groups. The reason why this conservative tendency is enhanced by reconsideration is not clear. The initial conservative positions and the conservative shift indicated that the evaluation of winning was not very high for these items. The prizes may have been too small or the tasks may have been uninteresting to the

subjects. It is possible that larger prizes might have had more influence in the group discussion. More research to examine the influence of the prize is needed. However, since discussion elicited an increase in risk in the absence of a prize-stake mediation it appears that an alternative explanation is needed to account for the apparent alterations in the evaluation of the items.

It had been expected that discussion would lead to a shift in the high risk direction for items with prizes higher than the stake and a conservative shift for items with prizes lower than the stake. The questionnaire effect on the last administration of the scale indicated that both reconsideration and discussion produced this effect. The items in this study are much less complicated than the life situation items more commonly used in the group risk taking research. For this reason discussion might not reveal as much information about these items as it does for the life situation items, and the differences between individual reconsideration and discussion might not be as strong as would occur on more complicated items. These results, coupled with the consensus shift scores, suggest that both the prize and the stake are influencing the risky shift. However, the influence of the stake is enhanced by group discussion alone and probably is not sustained following the discussion, while the influence of the prize is determined by a re-examination of the risk positions which might occur in either discussion or non-discussion conditions. The influence of the stake appears to be primarily a conformity effect, while the influence of the prize appears to be primarily an informational effect.

The stakes and the prizes in the life situation items have not been adequately measured, but an inspection of these items suggests that in the risky shift items, stakes are low and the prizes are higher than the stakes. In the conservative shift items the stakes appear to be high, and the prizes appear lower than the stakes. This observation suggests that in most of the group risk taking research, both discussion effects and the influence of re-examination of risk taking positions are operating, but the research paradigm does not allow for the two effects to be separated.

It was predicted that the shift in risk taking occurs because discussion leads to a devaluation of the prize when the prize is lower than the stake and an increase in evaluation of the prize when the prize is higher than the stake. This re-evaluation would elicit a change in risk taking for discussion relative to non-discussion groups, with the direction of the change depending upon the direction of the shift in the evaluation of the prize. However, stake-prize combinations affected risk taking in both discussion and non-discussion conditions. A test of the possible mediating effect of re-evaluation that would explain this risk-shift could not be made with the experimental paradigm used. To test the mediation of the prize re-evaluation an additional control group or change scores would be necessary. The data collected, however, do clarify the discussion and stake effects in the shift scores.

The evaluations indicated that both the stakes and the prizes were enhanced by group discussion. The form of this re-evaluation is

interesting because, although both the stakes and the prizes were re-evaluated, the monetary values were only influential in the re-evaluation of the stakes. It appears that the stakes were re-evaluated for their monetary values because, as the stake increased, the difference between the discussion and no discussion conditions also increased. The prizes were re-evaluated regardless of their monetary values, which suggested that they were re-evaluated because of an added reward value connected with winning. These data explained why, following group discussion, an increase in risk occurred independently of the prize. Thus, discussion may lead to the enhancement of two counter-acting forces. One leads to an increase in the evaluation of the stake, with a greater stake leading to a greater evaluation. The other leads to an increase in the evaluation of winning, but the increase is not dependent upon the differing values of the prize. On any particular item, when the increase in the evaluation of the stake is larger than the increase in the evaluation of winning, there is a conservative shift. If the increase in the evaluation of winning is greater than the increase in the evaluation of the stake, there is a risky shift.

Group discussion might stimulate the presentation of the two counter-arguments, one supporting the evaluation of winning and the other supporting the evaluation of the stake, which there is a chance of losing. Both arguments are considered by members of the group, but if the stake is small, the argument supporting the evaluation of winning gains the greater support. If the stake is large the argument supporting the evaluation of the stake gains the greater support.

Factors leading to the presentation of these counter-arguments, such as group size, talkativeness, and variability within the group would enhance the phenomenon.

The data on the evaluations of the stake and the prize, with the exception of the discussion effects, revealed little of interest. The subjects appeared to have difficulty in evaluating the relative values of the stakes and prizes, but different instructions or a task in which absolute money values are not involved might overcome this difficulty.

The evaluations given to the chances of winning and the chances of losing indicated that subjects interpreted an increase in risk on the probability acceptance scale as an increase in the chance of losing and a decrease in the chance of winning. This emphasis on loss offered a possible explanation of why, on this type of item, the subjects tended to be conservative. Since the prospects of losing are more salient to the subjects, social influence would have a greater effect on the evaluation of the possible loss than on the evaluation of the possible gain. This would explain why the stake influenced the risky shift by means of a conformity effect. In another type of item, in which the prospects of winning are more salient, another type of mediating process might occur. Further support for the notion that discussion shifts attention to the prospects of losing is found in the discussion X prize interaction in the evaluation of the chance of winning. When the prizes were large, subjects in discussion conditions interpreted a large amount of risk as a large chance of losing, but

they do not perceive any differences in their chance of winning as do the non-discussion subjects. Apparently the different prospects of winning that existed on different items had little influence upon the discussion groups.

The increase in confidence scores did not support the conclusion that people become more confident following the group discussion, but data indicating that groups who had discussed the items took a shorter time to fill out the last questionnaire does support this conclusion.

The data suggesting that subjects were more confident on items on which they took less risk supported Marquis and Reitz's (1969) suggestion of a correlation between risk taking and certainty. However, the trends in the data reported here are very weak and more research is needed to establish a connection between risk taking and confidence.

REFERENCES

- Allport, F. Social Psychology. Boston: Houghton-Mifflin, 1924.
- Atthowe, J. M., Jr. Interpersonal decision making: The resolution of a dyadic conflict. Journal of Abnormal and Social Psychology, 1961, 62, 114-119.
- Bateson, N. Familiarization, group discussion, and risk taking. Journal of Experimental Social Psychology, 1966, 2, 119-129.
- Bem, D. J., Wallach, M. A., & Kogan, N. Group decision making under risk of aversive consequences. Journal of Personality and Social Psychology, 1965, 1, 453-460.
- Blank, A.D. Effects of group and individual conditions on choice behavior. Journal of Personality and Social Psychology, 1968, 8, 294-298.
- Bovard, E. W., Jr. Conformity to group norms and attraction to groups. Science, 1953, 118, 598-599.
- Bovard, E. W., Jr. Interaction and attraction to the group. Human Relations, 1956, 9, 481-489.
- Brown, R. Social Psychology. New York: Free Press, 1965.
- Burns, J. F. An extremity-variance analysis of group decisions involving risk. Unpublished doctoral thesis, Massachusetts Institute of Technology, School of Industrial Management, 1967.
- Clark, R. D., & Willems, E. P. Where is the risky shift? Dependence on Instructions. Journal of Personality and Social Psychology, 1969, 13, 215-221.
- Clausen, G. Risk taking in small groups. Unpublished doctoral thesis. The University of Michigan, 1965.
- Coombs, C. H., & Pruitt, D. G. Components of risk in decision making: Probability and variance preferences. Journal of Experimental Psychology, 1960, 60, 265-277.
- Edwards, W., Lindman, H., & Phillips, L. D. Emerging technologies for making decisions. In New Directions in Psychology, II. New York: Holt, Rinehart and Winston, 1965, pp. 259-325.
- Ellis, H. D., Spencer, C. P., & Oldfield-Box, H. Matched groups and the risky shift phenomena; A defense of the extreme member hypothesis. British Journal of Social and Clinical Psychology, 1969, 8, 333-339.

- Flanders, J. P., & Thistlethwaite, D. L. Effects of familiarization and group discussion upon risk taking. Journal of Personality and Social Psychology, 1967, 5, 91-97.
- Goodnow, J. J. Determinants of choice-distribution in two-choice situations. American Journal of Psychology, 1955, 68, 106-116.
- Greenhouse, S.W., & Geisser, S. On methods in the analysis of profile data. Psychometrika, 1959, 24, 95-112.
- Haley, H. J. Group composition effects on risk-taking. Unpublished Master's Thesis, University of Alberta, 1968.
- Hinds, W. C. Individual and group decisions in gambling situations. Unpublished Master's Thesis, School of Industrial Management, Massachusetts Institute of Technology, 1962.
- Hoyt, G. C., & Stoner, J. A. F. Leadership and group decisions involving risk. Journal of Experimental Social Psychology, 1968, 4, 275-284.
- Hubbard, J. H. Effects of uncertainty on individual and group risk taking. Unpublished Master's Thesis, School of Industrial Management, Massachusetts Institute of Technology, 1963.
- Hunt, E. B., & Rowe, R. R. Group and individual economic decision making in risk conditions. In D.W. Taylor (Ed.), Experiments on decision making and other studies. Technical Report No. 6 to the Office of Naval Research on Contract Nonr 609(20), 1960, pp. 21-25.
- Kogan, N., & Wallach, M. A. Effects of physical separation of group members upon group risk taking. Human Relations, 1967a, 20, 41-48.
- Kogan, N., & Wallach, M. A. Group risk taking as a function of members' anxiety and defensiveness levels. Journal of Personality, 1967b, 35, 50-63.
- Kogan, N., & Wallach, M. A. The risky-shift phenomenon in small decision-making groups; A test of the information-exchange hypothesis. Journal of Experimental Social Psychology, 1967c, 3, 75-84.
- Kogan, N., & Wallach, M. A. Risk taking as a function of the situation, the person and the group. In G. Mandler et al., New directions in psychology III. New York: Holt, Rinehart and Winston, 1967d.
- Kramer, C. Y. Extension of multiple range tests to group means with unequal numbers of replications. Biometrics, 1956, 12, 307-310.

- Lamm, H. Will an observer advise higher risk taking after hearing a discussion of the decision problem? Journal of Personality and Social Psychology, 1967, 6, 467-471.
- LeBon, G. The crowd. New York: The MacMillan Company, 1895.
- Levinger, G. & Schneider, D. J. Test of the "risk is a value" hypothesis. Journal of Personality and Social Psychology, 1969, 11, 165-169.
- Loneragan, B. G., & McClintock, C. G. Effects of group membership on risk-taking behavior. Psychological Reports, 1961, 8, 447-455.
- Madaras, G. R., & Bem, D. J. Risk and conservatism in group decision-making. Journal of Experimental Social Psychology, 1968, 4, 350-365.
- Marquis, D. G. Individual responsibility and group decisions involving risk. Industrial Management Review, 1962, 3, 8-23.
- Marquis, D. G. Individual and group decisions involving risk. Industrial Management Review, 1968, 9, 69-75.
- Marquis, D. G., & Reitz, H. J. Effects of uncertainty on risk taking in individual and group decisions. Behavioral Science, 1969, 14, 281-288.
- McNeill, W. H. The rise of the west. Chicago: The University of Chicago Press, 1963.
- Nordhøy, F. Group interaction in decision making under risk. Unpublished Master's Thesis, Massachusetts Institute of Technology, School of Industrial Management, 1962.
- Pruitt, D.G., & Teger, A. I. Is there a shift toward risk in a group discussion? If so, is it a group phenomenon? If so, what causes it? 1967, APA Convention Paper.
- Pruitt, D. G., & Teger, A. I. The risky shift in group betting. Journal of Experimental Social Psychology, 1969, 5, 115-126.
- Rabow, J., Fowler, F. J., Bradford, D. L., Hofeller, M. A., & Shibuya, Y. The role of social norms and leadership in risk taking. Sociometry, 1966, 29, 16-27.
- Rettig, S. Ethical risk taking in group and individual conditions. Journal of Personality and Social Psychology, 1966a, 4, 648-654.
- Rettig, S. Group discussion and predicted ethical risk-taking. Journal of Personality and Social Psychology, 1966b, 3, 629-633.

- Rettig, S., & Turoff, S. J. Exposure to group discussion and predicted ethical risk taking. Journal of Personality and Social Psychology, 1967, 7, 177-180.
- Rim, Y. Risk taking and need for achievement. Acta Psychologica, 1963, 21, 108-115.
- Rim, Y. Personality and group decisions involving risk. Psychological Records, 1964a, 14, 37-45.
- Rim, Y. Social attitudes and risk taking. Human Relations, 1964b, 17, 259-265.
- Rim, Y. Machiavellianism and decisions involving risk. British Journal of Social and Clinical Psychology, 1966, 5, 30-36.
- Rule, B. G., & Evans, J. Familiarization, the presence of others and group discussion effects on risk taking. Representative Research in Social Psychology, 1970, in press.
- Siegal, S., & Goldstein, D. A. Decision-making behavior in a two-choice uncertain-outcome situation. Journal of Experimental Psychology, 1959, 57, 37-42.
- Siegal, S., & Zajonc, R. B. Group risk taking in professional decisions. Sociometry, 1967, 30, 339-349.
- Stoner, J. A. F. A comparison of individual and group decisions involving risk. Unpublished Master's Thesis, School of Industrial Management, Massachusetts Institute of Technology, 1961.
- Stoner, J. A. F. Risky and cautious shifts in group decisions: The influence of widely held values. Journal of Experimental Social Psychology, 1968, 4, 442-459.
- Teger, A. I., & Pruitt, D. G. Components of group risk taking. Journal of Experimental Social Psychology, 1967, 3, 189-205.
- Vidmar, N. Group composition and the risky shift. Journal of Experimental Social Psychology, 1970, 6, 153-166.
- Vinokur, A. Distribution of initial risk levels and group decisions involving risk. Journal of Personality and Social Psychology, 1969, 13, 207-214.
- Wallach, M. A., & Kogan, N. Sex differences and judgement processes. Journal of Personality, 1959, 27, 555-564.
- Wallach, M. A., & Kogan, N. Aspects of judgement and decision-making: Interrelationships and changes with age. Behavioral Science, 1961, 6, 23-36.

- Wallach, M. A., & Kogan, N. The roles of information, discussion and consensus in group risk taking. Journal of Experimental Social Psychology, 1965, 1, 1-19.
- Wallach, M. A., Kogan, N., & Bem, D. J. Group influence on individual risk taking. Journal of Abnormal and Social Psychology, 1962, 65, 75-86.
- Wallach, M. A., Kogan, N., & Bem, D. J. Diffusion of responsibility and level of risk taking in groups. Journal of Abnormal and Social Psychology, 1964, 68, 263-274.
- Wallach, M. A., Kogan, N., & Burt, R. B. Can group members recognize the effects of group discussion upon risk taking? Journal of Experimental Social Psychology, 1965, 1, 379-395.
- Wallach, M. A., Kogan, N., & Burt, R. B. Group risk-taking and field dependence-independence of group members. Sociometry, 1967, 30, 323-338.
- Wallach, M. A., Kogan, N., & Burt, R. B. Are risk takers more persuasive than conservatives in group discussion? Journal of Experimental Social Psychology, 1968, 4, 76-88.
- Wallach, M. A., & Mabli, J. Information versus conformity in the effects of group discussion of risk taking. Journal of Personality and Social Psychology, 1970, 14, 149-156.
- Wallach, M.A., & Wing, C. W., Jr. Is risk a value? Journal of Personality and Social Psychology, 1968, 9, 101-106.
- Witkin, H. A., Dyk, R. B., Faterson, H. F., Goodenough, D. R., & Karp, S. A. Psychological Differentiation, New York: John Wiley and Sons, Inc., 1962.
- Zajonc, R. B. Social Facilitation. Science, 1965, 149, 269-274.
- Zajonc, R. B., Wolosin, R. J., Wolosin, M. A., & Loh, W. D. Social facilitation and imitation in group risk-taking. Journal of Experimental Social Psychology, 1970, 6, 26-46.
- Zajonc, R. B., Wolosin, R. J., Wolosin, M. A., & Sherman, S. J. Individual and group risk-taking in a two-choice situation. Journal of Experimental Social Psychology, 1968, 4, 89-106.
- Zajonc, R. B., Wolosin, R. J., Wolosin, M. A., & Sherman, S. J. Group risk-taking in a two-choice situation: Replication, extension, and a model. Journal of Experimental Social Psychology, 1969, 5, 127-140.

APPENDICES

APPENDIX A

PROBABILITY ACCEPTANCE SCALES

PROBABILITY ACCEPTANCE SCALE

On the following pages are a series of stake and prize combinations, that you may play in a betting situation. To play, you have to chance losing the stake in order to win the prize. If you lose, you will have to pay the value of the stake, but if you win, you will be able to keep the stake, and also you will be given the value of the prize.

You have a choice of what probabilities at which you would be willing to play the game. You are to check off the lowest probability of winning that you would accept in order to play the game. If the actual probability of winning is lower than the lowest probability at which you are willing to play, you do not have to wager your stake, but you also have no chance of winning the prize. If the actual probability is higher than the lowest probability at which you are willing to play, you will wager your stake at the actual probability of winning.

If the stake is \$.35 and the prize is \$.45, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____ The probability would have to be at least 1/20 before I would be willing to take the chance.

_____ The probability would have to be at least 3/20 before I would be willing to take the chance.

_____ The probability would have to be at least 5/20 before I would be willing to take the chance.

 The probability would have to be at least 7/20 before I would be willing to take the chance.

_____The probability would have to be at least 9/20 before I would be willing to take the chance.

_____ The probability would have to be at least 11/20 before I would be willing to take the chance.

The probability would have to be at least 13/20 before I would be willing to take the chance.

The probability would have to be at least 15/20 before I would be willing to take the chance.

_____ The probability would have to be at least 17/20 before I would be willing to take the chance.

The probability would have to be at least 19/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

Extremely Confident Not Confident

If the stake is \$1.20 and the prize is \$1.60, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____The probability would have to be at least 1/20 before I would be willing to take the chance.

_____The probability would have to be at least 3/20 before I would be willing to take the chance.

 The probability would have to be at least 5/20 before I would be willing to take the chance.

The probability would have to be at least .7/20 before I would be willing to take the chance.

 The probability would have to be at least 9/20 before I would be willing to take the chance.

 The probability would have to be at least 11/20 before I would be willing to take the chance.

The probability would have to be at least 13/20 before I would be willing to take the chance.

 The probability would have to be at least 15/20 before I would be willing to take the chance.

 The probability would have to be at least 17/20 before I would be willing to take the chance.

 The probability would have to be at least 19/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

Extremely Confident

Not Confident

If the stake is \$.60 and the prize is \$.80, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____ The probability would have to be at least 19/20 before I would be willing to take the chance.

_____ The probability would have to be at least 17/20 before I would be willing to take the chance.

_____ The probability would have to be at least 15/20 before I would be willing to take the chance.

_____ The probability would have to be at least 13/20 before I would be willing to take the chance.

_____ The probability would have to be at least 11/20 before I would be willing to take the chance.

_____ The probability would have to be at least 9/20 before I would be willing to take the chance.

_____ The probability would have to be at least 7/20 before I would be willing to take the chance.

_____ The probability would have to be at least 5/20 before I would be willing to take the chance.

_____ The probability would have to be at least 3/20 before I would be willing to take the chance.

_____ The probability would have to be at least 1/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

/ / / / / / / / / / /

Extremely
Confident

Not
Confident

If the stake is \$.90 and the prize is \$1.20, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____The probability would have to be at least 1/20 before I would be willing to take the chance.

_____The probability would have to be at least 3/20 before I would be willing to take the chance.

_____The probability would have to be at least 5/20 before I would be willing to take the chance.

_____The probability would have to be at least 7/20 before I would be willing to take the chance.

_____The probability would have to be at least 9/20 before I would be willing to take the chance.

_____The probability would have to be at least 11/20 before I would be willing to take the chance.

_____The probability would have to be at least 13/20 before I would be willing to take the chance.

_____The probability would have to be at least 15/20 before I would be willing to take the chance.

_____The probability would have to be at least 17/20 before I would be willing to take the chance.

_____The probability would have to be at least 19/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

/

/

/

/

/

/

/

/

/

/

/

Extremely
Confident

Not
Confident

If the stake is \$.60 and the prize is \$1.00, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____ The probability would have to be at least 19/20 before I would be willing to take the chance.

_____ The probability would have to be at least 17/20 before I would be willing to take the chance.

_____The probability would have to be at least 15/20 before I would be willing to take the chance.

The probability would have to be at least 13/20 before I would be willing to take the chance.

 The probability would have to be at least 11/20 before I would be willing to take the chance.

 The probability would have to be at least 9/20 before I would be willing to take the chance.

 The probability would have to be at least 7/20 before I would be willing to take the chance.

 The probability would have to be at least 5/20 before I would be willing to take the chance.

The probability would have to be at least 3/20 before I would be willing to take the chance.

_____ The probability would have to be at least 1/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

Extremely Not
Confident Confident

If the stake is \$1.20 and the prize is \$2.00, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____ The probability would have to be at least 1/20 before I would be willing to take the chance.

The probability would have to be at least 3/20 before I would be willing to take the chance.

_____ The probability would have to be at least 5/20 before I would be willing to take the chance.

_____ The probability would have to be at least 7/20 before I would be willing to take the chance.

_____ The probability would have to be at least 9/20 before I would be willing to take the chance.

_____ The probability would have to be at least 11/20 before I would be willing to take the chance.

_____ The probability would have to be at least 13/20 before I would be willing to take the chance.

_____ The probability would have to be at least 15/20 before I would be willing to take the chance.

The probability would have to be at least 17/20 before I would be willing to take the chance.

 The probability would have to be at least 19/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

Extremely Not
Confident Confident

If the stake is \$.90 and the prize is \$1.50, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

 The probability would have to be at least 19/20 before I would be willing to take the chance.

_____ The probability would have to be at least 17/20 before I would be willing to take the chance.

The probability would have to be at least 15/20 before I would be willing to take the chance.

The probability would have to be at least 13/20 before I would be willing to take the chance.

_____ The probability would have to be at least 11/20 before I would be willing to take the chance.

The probability would have to be at least 9/20 before I would be willing to take the chance.

_____ The probability would have to be at least 7/20 before I would be willing to take the chance.

_____ The probability would have to be at least 5/20 before I would be willing to take the chance.

_____ The probability would have to be at least 3/20 before I would be willing to take the chance.

The probability would have to be at least 1/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

Extremely Confident

Not Confident

PROBABILITY ACCEPTANCE SCALE

On the following pages are a series of stake and prize combinations, that you may play in a betting situation. To play, you have to chance losing the stake in order to win the prize. If you lose, you will have to pay the value of the stake, but if you win, you will be able to keep the stake, and also you will be given the value of the prize.

You have a choice of what probabilities at which you would be willing to play the game. You are to check off the lowest probability of winning that you would accept in order to play the game. If the actual probability of winning is lower than the lowest probability at which you are willing to play, you do not have to wager your stake, but you also have no chance of winning the prize. If the actual probability is higher than the lowest probability at which you are willing to play, you will wager your stake at the actual probability of winning.

If the stake is \$.35 and the prize is \$.25, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____ The probability would have to be at least 1/20 before I would be willing to take the chance.

_____The probability would have to be at least 3/20 before I would be willing to take the chance.

_____The probability would have to be at least 5/20 before I would be willing to take the chance.

 The probability would have to be at least 7/20 before I would be willing to take the chance.

_____ The probability would have to be at least 9/20 before I would be willing to take the chance.

The probability would have to be at least 11/20 before I would be willing to take the chance.

The probability would have to be at least 13/20 before I would be willing to take the chance.

_____ The probability would have to be at least 15/20 before I would be willing to take the chance.

The probability would have to be at least 17/20 before I would be willing to take the chance.

_____ The probability would have to be at least 19/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

Extremely Not
Confident Confident

If the stake is \$1.20 and the prize is \$.80, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____ The probability would have to be at least 1/20 before I would be willing to take the chance.

 The probability would have to be at least 3/20 before I would be willing to take the chance.

_____ The probability would have to be at least 5/20 before I would be willing to take the chance.

The probability would have to be at least 7/20 before I would be willing to take the chance.

 The probability would have to be at least 9/20 before I would be willing to take the chance.

_____ The probability would have to be at least 11/20 before I would be willing to take the chance.

The probability would have to be at least 13/20 before I would be willing to take the chance.

The probability would have to be at least 15/20 before I would be willing to take the chance.

_____ The probability would have to be at least 17/20 before I would be willing to take the chance.

_____ The probability would have to be at least 19/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

Extremely Confident _____ Not Confident

The probability would have to be at least 19/20 before I would be willing to take the chance.

 The probability would have to be at least 15/20 before I would be willing to take the chance.

_____ The probability would have to be at least 13/20 before I would be willing to take the chance.

The probability would have to be at least 11/20 before I would be willing to take the chance.

_____ The probability would have to be at least 9/20 before I would be willing to take the chance.

The probability would have to be at least 7/20 before I would be willing to take the chance.

 The probability would have to be at least 5/20 before I would be willing to take the chance.

 The probability would have to be at least 3/20 before I would be willing to take the chance.

The probability would have to be at least $\frac{1}{20}$ before I would be willing to take the chance.

Extremely Confident _____ Not Confident

If the stake is \$.90 and the prize is \$.60, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

 The probability would have to be at least 19/20 before I would be willing to take the chance.

The probability would have to be at least $\frac{17}{20}$ before I would be willing to take the chance.

The probability would have to be at least 15/20 before I would be willing to take the chance.

_____ The probability would have to be at least 13/20 before I would be willing to take the chance.

_____ The probability would have to be at least 11/20 before I would be willing to take the chance.

 The probability would have to be at least 9/20 before I would be willing to take the chance.

 The probability would have to be at least 7/20 before I would be willing to take the chance.

_____ The probability would have to be at least 5/20 before I would be willing to take the chance.

_____ The probability would have to be at least 3/20 before I would be willing to take the chance.

_____ The probability would have to be at least 1/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

Extremely Confident _____ Not Confident

If the stake is \$.90 and the prize is \$.30, what would be the lowest probability of winning that you would consider acceptable before you would be willing to chance losing the stake in order to win the prize?

_____ The probability would have to be at least 1/20 before I would be willing to take the chance.

_____ The probability would have to be at least 3/20 before I would be willing to take the chance.

_____ The probability would have to be at least 5/20 before I would be willing to take the chance.

_____ The probability would have to be at least 7/20 before I would be willing to take the chance.

_____ The probability would have to be at least 9/20 before I would be willing to take the chance.

_____ The probability would have to be at least 11/20 before I would be willing to take the chance.

_____ The probability would have to be at least 13/20 before I would be willing to take the chance.

_____ The probability would have to be at least 15/20 before I would be willing to take the chance.

_____ The probability would have to be at least 17/20 before I would be willing to take the chance.

_____ The probability would have to be at least 19/20 before I would be willing to take the chance.

How confident are you that this choice of probability is the best one?

/	/	/	/	/	/	/	/	/	/	/
Extremely										Not
Confident										Confident

APPENDIX B

RATING SHEET FOR EVALUATIONS OF PRIZE, STAKE, PROBABILITY
OF WINNING, AND PROBABILITY OF LOSING

If you lose this stake how would you evaluate your loss, when you consider what you might have won with it? In other words, how would you evaluate the cost of attempting to win the prize? Put a check mark above the adjective that you feel would best describe the value of the stake.

/	/	/	/	/	/
Very	Quite	Moderately	Slightly	Of No Value	
Valuable	Valuable	Valuable	Valuable	at all	

If you win this prize how would you evaluate your winnings when you consider what you had to stake in order to obtain it? In other words, how would you evaluate the prize when you consider the cost of attempting to win it? Put a check mark above the adjective that you feel would best describe the value of the prize.

/	/	/	/	/	/
Very	Quite	Moderately	Slightly	Of No Value	
Valuable	Valuable	Valuable	Valuable	at all	

How would you estimate the chance of winning on this item? Put a check mark above the adjective that you feel would best describe the chance of your winning on this item.

/	/	/	/	/	/
Extremely	Very	High	Low	Very	Extremely
High	High			Low	Low

How would you evaluate the chance of losing on this item? Put a check mark above the adjective that you feel would best describe the chance of your losing on this item.

/	/	/	/	/	/
Extremely	Very	High	Low	Very	Extremely
High	High			Low	Low

APPENDIX C

FILLER TASK

COMPOSITION ON INDIAN HISTORY

EXPANSION AND DEVELOPMENT OF THE
INDIAN CIVILIZATION
OF EURASIA, 500-100 B.C.

India

The most active seat of Indian civilization in 500 B.C. was in the Ganges Valley, where powerful, centralized kingdoms were in the process of destroying older tribal and aristocratic polities. The Indus Valley, part of which was then under Persian government, remained politically divided and socially conservative, although various influences from the Middle East-coined money, for example-filtered into India from that direction. The south, for which no records are available, was presumably undergoing a gradual Aryanization through contact with the culturally more advanced north.

When Alexander invaded India (327 B.C.), the Ganges kingdom of Magadha had already subdued most of northeastern India. Shortly afterward, Chandragupta Maurya (reigned 322-298 B.C.) united the Ganges and Indus valleys into a single great empire, based on the kernel of the Magadha kingdom. His grandson Ashoka (reigned ca. 273-232 B.C.) brought the empire to its greatest extent, controlling almost all India except for a small area in the extreme south. Ashoka's heirs were unable to maintain the unity of this farflung state, which soon disintegrated into smaller and perhaps competing units; and about 185 B.C. a usurper drove the last Maurya ruler from the throne of Magadha. Simultaneously, or soon thereafter, invaders from the northwest-first Greek rulers of Bactria, then tribes of Shakas and Kushans- gave Indian politics a new complexion. These invaders did not conquer all of India; their control only sporadically extended beyond the Punjab. To the south and east, other states, the boundaries and very names of which are often unsure, divided the Maurya heritage.

Chronological uncertainties make exact history impossible for these centuries. Nonetheless, it is clear that Indian culture continued to develop along the lines already defined. Oral transmission of literature and learning was the rule in the time of Buddha (d. ca. 486 B.C.); and the habit of putting texts on paper gained intellectual respectability very slowly. Its oral forms gave Indian literature a wide flexibility. New ideas and emphases, glosses and omissions grafted themselves almost imperceptibly onto older materials, as one master after another passed on the wisdom of the past to his pupils. Only sacred texts like the Vedas, or recognized and authoritative classics like Panini's Sanskrit grammar, escaped such protean evolution across the generations.

The oral evolution of Indian literature blunts the tools of textual criticism which Western scholars are accustomed to use in analyzing the development of thought. Existing manuscripts, all of them dating from relatively recent times, represent the deposit of a centuries-long oral development; and there is no sure way to tell which passages may have survived unaltered and which are new- nor the dates of any part thereof. As a result, the chronology and authenticity of all early Indian literature is a subject of fundamentally insoluble controversy.

Despite pervasive uncertainty, surviving texts make it clear that Brahminism was on the defensive from the fifth century B.C. until after the time of Ashoka. To be sure, the old Vedic learning, with its elaborations in the Brahmanas and Upanishads, continued to be studied in Brahminic schools. New commentaries and distillations of that wisdom were produced- the so-called sutras (literally "threads")- which attempted to apply traditional doctrine to the vast variety of sacrificial and everyday circumstances which might puzzle a pious Brahmin. Furthermore, the problem created by the growing divergence between spoken tongues and the sacred Vedic language gave rise to an impressive, if often recondite science of linguistics. The great monument of the new study was Panini's Sanskrit grammar, probably dating from the fourth century B.C. This book codified rules for "classical" Sanskrit- a language not identical with that of the Vedas, but derived directly from it.

In general, the Brahmins seem to have found it difficult to adjust to the changing social scene in India. The rise of cities, where mercantile and artisan populations mixed together cheek by jowl with men claiming superior social status by right of birth, accorded ill with the taboos and ritual observances required by Brahminical religion. Various sutras expressly forbade travel by ship. for example; and there were no Vedic rituals for urban circumstances. Towns were spoken of slightly in the sutras or simply neglected.

Buddhist writers offer a much more variegated picture of Indian society. Merchants and their voyages to distant parts figure favorably in many of the cautionary tales and pious stories which constitute the bulk of this literature; and these works preserve only incidental traces of the pride of birth and emphasis upon ritual purity so characteristic of Brahminical writings. It seems, therefore, that Buddhism (together with Jainism) appealed particularly to urban groups in India. The fact that the early Buddhist monks preached in the language of the streets and did not cultivate a recondite and semi-archaic language like Sanskrit must have helped them to win the popular ear.

A major problem for both Buddhists and Jains was the definition of their respective orthodoxies. Surviving records contain clear echoes of disputes and schisms affecting both religions. Recognition of an authoritative canon of scripture was an obvious way of limiting doctrinal controversy; but the Indian Buddhist, with characteristic ebullience, developed several collections of sacred texts and never quite managed to close the

canon, much less to determine which of a number of variant versions of a given story or sermon was the authoritative one. The emperor Ashoka may have attempted to bring a modicum of order to the confusion by summoning leading dignitaries of the faith to a council; but if so, he did not see fit to mention such a council in his famous rock edicts, which constitute the sole unimpeachable source for Indian history of his age.

These inscriptions, carved on rocks and pillars at Ashoka's command, tell us that the emperor was attracted to the Buddhist path after youthful disillusionment with more violent and traditional methods of statecraft. Early in his reign, Ashoka invaded and after a bloody fight annexed the sole important Indian state that had escaped the conquests of his grandfather. Thereafter, he foreswore military operations in favor of spiritual conquests and launched a series of missions to preach Buddhism among his own subjects and in neighboring lands as well. Prior to this time, Buddhism had found its main successes along the eastern and southern fringes of Aryan India, where Brahminism had only imperfectly won the assent of autochthonous peoples. Ashoka's missionary enterprises established Buddhism in all parts of India and in Ceylon and gave it at least a foothold in central Asia.

The religion that thus attracted Ashoka's support, and which he did so much to propagate, was already rather different from the metaphysical pessimism and moral discipline which Gautama Buddha had (perhaps) taught. To the original core had been added a rudimentary, popular cult, centering at stupas (shrines) built around the relics of holy men, or at other especially sacred places. Pillars, and trees commemorating the tree under which Duggha had received enlightenment, were often associated with the stupas.

Through such modifications, Buddhism assimilated itself to age-old local observances. Reverence for relics made it easy for holy places and spirits of the most diverse origins to assume a Buddhist garb; and the figure of the Buddha himself took on an increasingly superhuman character. The greatest shrines were those associated with the critical turning points of his life or built around portions of his ashes—divided, according to pious tradition, among several stupas immediately after his death, and further distributed by the piety of Ashoka, who built a large number of new stupas around portions of Buddha's earthly remains in diverse parts of his wide realm.

With state support and a cult accessible to the humblest understanding, Buddhism thus became a widely popular religion in India. For Ashoka himself, and presumably for most of his coreligionists, the doctrine and ritual of Buddhism were associated with a generous and comprehensive morality. The main theme of Ashoka's inscriptions was exactly this: exhortations to his people to conduct themselves in accordance with dharma. His own definition of dharma, as presented in the so-called Second Pillar Edict, was as follows: "Dharma is good. But what does dharma consist of? It consists of few sins and many good deeds, of kindness, liberality, truthfulness and purity". More particularly, dharma for Ashoka required toleration and mutual respect among the various religious groups of his realm and abstention from killing animals or men. He forbade animal sacrifices, thus bringing the power of the state to bear against the old Vedic rituals which involved such sacrifice; and he himself gave up hunting and warfare, the traditional sports of kings in India, as elsewhere.

As a man of religion, Ashoka was certainly one of the most characteristically Indian personalities who ever sat a throne; but he was also an emperor with pretensions to universal monarchy; and in this capacity he appears, like his father and grandfather before him, to have deserved the epithet "philhellene". The idea of universal empire may have reached India from Achaemenid Persia. Archeological investigations provide concrete evidences of affinities between the Mauryan and Persian courts, suggesting, for example, that the Maurya palace at Pataliputra was built around a great columned hall, quite in the style of Persepolis. Even more telling is the close resemblance of Mauryan sculpture to Persian (and Greek) models.

The Greek notion of the supremacy of the state over all aspects of human activity probably also attracted the Mauryan monarchs; and they may have tried to establish an efficient bureaucratic administration like that of Ptolemy in Egypt. Yet the usual uncertainty prevails, for the principal evidence concerning Mauryan government- the Arthashastra- is itself of questionable authenticity. Nevertheless, whether or not it describes real practices, the Arthashastra bears a strong imprint of Hellenistic ideas. In particular, its doctrine that the royal law was supreme, overriding sacred precedent and custom, was alien to older, as well as to later Indian tradition. We should probably interpret the Arthashastra less as a description of actual practice than as a handbook of advice to a ruler on how to maximize his power. Taken in this light, the Arthashastra, as well as the general administrative and military effort of the Mauryas, may be thought of as an attempt to implant upon the refractory body social of India a Greco-Iranian concept of the supremacy of the state as against all other forms of human association. Yet, in practice, the Mauryan administration was undoubtedly based upon older precedent within the kingdom of Magadha. And, although Chandragupta and his successors may have been dazzled by Hellenistic concepts of rulership, it was an indigenous Indian stratum that prevailed in the end.

To sum up: India's development to the time of Alexander's invasion appears to have pursued lines laid down at the beginning of the fifth century or before. With the new intimacy between India and the Hellenistic world that resulted from Alexander's venture, and with the rise of the "philhellenic" Mauryan dynasty within India itself, new, though still comparatively superficial, foreign influences upon Indian society became apparent. The royal court patronized a westernizing art style, and perhaps promulgated Greco-Iranian patterns of administration and political theory. Beyond the courtly circle, however, foreign influence was probably trifling until long after Mauryan times, when prolonged and more massive military and commercial contact with the Mediterranean world allowed a deeper penetration of Hellenistic and Roman influences into Indian society as a whole.

On the scale below rate the complexity of the writing style used in this composition.

/ / / / / / / / / / / / / / / /

Extremely Not
Complex Complex

On the scale below, rate the complexity of the content of the message that is communicated in this composition.

/ / / / / / / / / / / / / / / /

Extremely Not
Complex Complex

In one or two short sentences, tell what you felt was the most interesting aspect of this composition.

APPENDIX D

ANALYSES OF CONFIDENCE SCORES

TABLE I
Analysis of Variance of Initial Confidence Scores

Source	df	MS	F
Discussion (A)	1	5,700.11	1.20
Questionnaire (B)	1	5,967.39	1.26
A x B	1	1,184.78	-
ERROR (a) ^a	154	4,745.62	
Prize (C)	1	1,900.66	3.16
A x C	1	359.08	-
B x C	1	3,260.92	5.42*
A x B x C	1	2,025.45	3.37
ERROR (b) ^a	154	601.21	
Stake (D)	2	290.90	-
A x D	2	43.23	-
B x D	2	322.08	1.04
A x B x D	2	204.85	-
ERROR (c) ^a	308	309.55	
C x D	2	1,271.90	5.74**
A x C x D	2	699.84	3.16
B x C x D	2	1,093.18	4.94**
A x B x C x D	2	692.01	3.12
ERROR (d) ^a	308	221.41	

^aFor all error terms in the analysis, groups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

* $p < .05$

** $p < .05$, as determined by Greenhouse and Geisser Conservative Test, based on 1/154 df.

TABLE II
Analysis of Variance of Change in Confidence Scores

Source	df	MS	F
Discussion (A)	1	785.55	-
Questionnaire (B)	1	2,540.67	1.57
A x B	1	229.80	-
ERROR (a) ^a	149	1,616.92	
Prize (C)	1	328.03	-
A x C	1	196.53	-
B x C	1	1,354.50	2.44
A x B x C	1	1,274.78	2.30
ERROR (b) ^a	149	554.97	
Stake (D)	2	241.31	-
A x D	2	260.50	-
B x D	2	555.57	1.17
A x B x D	2	249.20	-
ERROR (c) ^a	298	475.70	
C x D	2	265.75	-
A x C x D	2	542.30	1.23
B x C x D	2	285.85	-
A x B x C x D	2	484.87	1.10
ERROR (d) ^a	298	441.94	

^aFor all error terms in the analysis, groups within treatments was not significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments and subjects within groups were pooled.

TABLE III

Analysis of Variance of Time to Reach Consensus

Source	df	MS	F
Questionnaire (A)	1	15.59	2.46
ERROR (a)	18	6.34	
Prize (B)	1	1.15	-
A x B	1	3.76	-
ERROR (b)	18	6.39	
Stake (C)	2	13.06	3.83
A x C	2	9.06	2.65
ERROR (c)	36	3.41	
B x C	2	5.30	1.23
A x B x C	2	7.49	1.74
ERROR (d)	36	4.31	

TABLE IV

Analysis of Variance of Time to Complete Initial Questionnaire

Source	df	MS	F
Discussion (A)	1	13.81	2.45
Questionnaire (B)	1	11.56	2.05
A x B	1	15.01	2.67
ERROR (a) ^a	36	5.62	5.65*
ERROR (b)	120	2.12	

^aGroups within treatments was significant where subjects within groups was used as the estimate of error. Therefore, groups within treatments was used as the error term.

* $p < .01$.

TABLE V
Analysis of Variance of Time to Complete Last Questionnaire

Source	df	MS	F
Discussion (A)	1	47.85	9.05*
Questionnaire (B)	1	2.14	-
A x B	1	19.95	3.77
ERROR (a) ^a	36	5.29	2.06*
ERROR (b)	120	2.56	

^aGroups within treatments was significant when subjects within groups was used as the estimate of error. Therefore, groups within treatments was used as the error term.

* $p < .01$

B29966